

Dental Digest

Sixty-Sixth Year of Publication

May 1960

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MAY 1960

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JOHN B. PUCKETT, D.D.S. (Baylor University, College of Dentistry, 1931) specializes in periodontia and has published previously on this subject. He presents in *DIGEST* this month a practical article on a problem frequently encountered in dentistry, THE CLINICAL APPLICATION OF ORTHOPERIODONTICS.

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A Theory Regarding the Effects of ATMOSPHERIC IONIZATION

HENRY C. HEIMANSOHN, D.D.S., Danville, Indiana

D I G E S T

Stress as used in this article does not refer to physical pressure or to psychologic reaction to a difficult external situation. Rather it refers to the body's hormonal adjustment as required to resist cold, heat, infection, positive ionization.

The theory has been advanced by Hans Selye that many diseases are basically due to a breakdown in the hormonal system. This theory has revolutionized the approach to medicine as previously many diseases were not known to be related. The human hormonal system is maintained in a delicate state of balance (homeostasis)

and its reaction to various types of stress is thought to be non-specific. It is as though a stress adding machine were built into all hormonal systems and when the total sum of stress reached a certain degree, chronic diseases were initiated. Acute diseases can also be stimulated by exceeding the limits of the stress mechanism. The weakest tissue system seems to be the one affected, probably an inherited tendency. Research is difficult in this subject as duplication and measurement of this delicate balance is not feasible.

Dental implications of this theory are discussed.

Present Status of Relationship of Atmospheric Elements to Man

Since the days of Benjamin Franklin and his famous kite-flying experiment in a thunderstorm, the fact of electrical charges in the atmosphere has been known. To date however little practical usage in medicine or dentistry has been made. Medical experiments are now in progress on this subject, but in general it is a neglected field except in the realm of physics where great efforts are being exerted in space exploration.

Three main reasons why the study of atmospheric electricity has not

been studied intensively by the health professions are:

(1) This factor is not recorded physically as humidity, barometric pressure, and temperature.

(2) Many branches of science are concerned such as physics, chemistry, bacteriology.

(3) The medical sciences have tended to concentrate on the internal environment of man such as antibody formation, theories of focal infection, and hormonal physiology, most of which can be measured but which do not answer all the problems facing the clinician.

Research Undertaken—Since March 1958, members of the American In-

stitute of Medical Climatology, directed by George M. Piersol, M.D., have been working closely with the Philadelphia police department, the medical examiner, and other officials on far-reaching research projects.¹ The results so far are the following: Data on 40,000 major crimes were correlated with temperature and other weather factors on the specific hour and day of each crime.

Conclusions from the Philadelphia Study

(a) Heat and Humidity Increase Crimes of Violence: Murder, rape, and aggravated assault increased by 45 per cent on muggy, warm days and nights when skies were clear and the temperature averaged about 80 degrees. Such crimes of violence also mounted, by about a third, on dreary days when the sky was overcast and the air humid, although the temperature was only about 70 degrees.

(b) Sudden Changes Often Trigger Heart Attacks: Studying 250 cases of coronary occlusion, Philadelphia climatologists learned that three out of five attacks occurred when a cold front appeared abruptly, as both temperature and barometer dropped sharply. It was evidently the strain of adapting to the *change* of weather that caused the heart attacks.

(c) Shifts in Weather Affect All Bodily Functions: The immediate effect of any change in the weather shows up in blood pressure, pulse, body temperature, and urine, that is, in all the metabolic and chemical processes of the body. Some people adjust satisfactorily, others cannot.

¹Irwin, Theodore: Why We Change When the Weather Changes, Popular Science 174:118-120 (November) 1959.

Often people on the verge of disease surrender when a sharp weather shift lowers their resistance. To many already ill, a violent break in the weather may push them over the brink of death.

(d) **Why Surgeons Watch the Weather:** In Hamburg, surgeons and meteorologists compared results of thousands of operations (especially cases of postoperative bleeding and embolism) with the prevailing weather at the time. Now, early every morning, a bulletin is issued by the Hamburg Central Bureau of Meteorology. Through these bulletins surgeons are alerted when it will be unwise to do elective surgery (other than emergency operations) that day.

(e) **The Role of Ions:**² Some scientists here and abroad maintain that they have discovered why changing weather can influence human health and behavior. The mysterious ingredient is electrical charges in the air (ions). These investigators are convinced of the following:

(1) Positive ions can make the mind and body function considerably below par.

(2) Negative ions can make the mind and body function better.

Ions Always Present: There are always ions in the air and normally they do not interfere although over half of them are positive. But it is believed that when this delicate balance is upset by inclement weather sensitive persons are affected.

Method of Activity: When the barometric pressure drops, air rushes in to fill the partial vacuum created. This air, descending from jet stream regions or sucked upward from pores in the sandy earth, is likely to import large quantities of positive ions which create discomfort. Negative ions, produced by cosmic radiation and ultraviolet-treated layers higher up in the atmosphere, produce that invigorated feeling after a thunderstorm.

Experimental Use of Ions—Use of negative ions in various devices for treating many ailments is common in Soviet Russia,³ but only three United States Hospitals are using them. They are being tried, experimentally, par-



Heat Wave

Severe Storms

Accidents

Business Problems

Weather Changes

Social Problems

Family Problems

Health Problems

²op. cit.
³op. cit.

Source of Basic Information in Theory

Science	Title of Division	Why Important	Discussion
Physics	Weather	Positive charges in atmosphere when the barometric pressure drops.	Lower pressure sucks positively charged air earthward.
Chemistry	Colloidal chemistry	Bacteria behave as colloidal particles.	Colloidal particles attracted by opposite charges.
Bacteriology	Electrophoretic phenomenon	Bacteria are negatively charged on their surface.	Bacteria are attracted to more positively charged bodies.
Medicine	Stress	Explains relationships of hormones to body functions.	Positive ions in the air produce stress reaction in the body.

ticularly for airborne allergies such as hay fever.

General Status of Research—In this article the subject of the effect of weather on health is taken a step further and a unified theory is presented showing the relationship of cause and effect. In a subject this broad there is the possibility of becoming involved in details and it is also difficult to prove all the factors related to a theory.

Advantages Derived From Theory

If it were possible to produce a workable theory, three main benefits could be derived:

- (1) Idiopathic results in dental surgery and dental infections could be accounted and predicted.
- (2) Extensive surgery on days that contraindicate such surgery could be avoided.
- (3) The electrical charges in the dental operatory could be artificially controlled thus (a) reducing the constant barrage of infection to which the dentist is exposed, thus rendering him less likely to catch colds, and (b) assuring a more sterile field for oral surgery. There are now assumed to be hundreds of viruses and bacteria that are pathologic to man and it is not practical to be vaccinated against all of them at this time. It would be much more productive to arrange the

electrical charges in the room so that the bacteria and viruses would be repelled by the mucous membranes of the upper respiratory tract.

Theory of Atmospheric Background

The method by which rain clouds in a thunderstorm become electrically charged⁴ is not fully understood, but it has been proved experimentally that large, swiftly falling drops become positively charged. As a result, rain clouds are negatively charged at their bases and positively charged at their tops. The negative charge at the base of the cloud also induces a positive charge on the earth beneath it, which acts as the second plate of a huge condenser. When two clouds approach each other or when the electrical potential difference between a cloud and the earth reaches a sufficiently high value, the air is ionized and a lightning flash results.

New Theory Postulated—It is that the space charge, existing between the ionosphere and the earth, initiates the electrification process. According to this theory, the upward flow of warm air through thunderclouds carries positive particles which accumulate at the top of the cloud and at

tract negative charges from the upper atmosphere; powerful downdrafts on the cloud's periphery carry the negative particles to the base of the cloud, preventing the charged particles from neutralizing one another.

May be Causative Factor—The new theory suggests that electrification may be a causative factor in precipitation rather than a consequence of it.

The Ionosphere—This is the section of space of chief concern in this article. It is a region⁵ of electrically charged (ionized) air beginning about 25 miles above the surface of the earth, by means of which radio waves are transmitted to great distances. It includes several layers (D layer, E layer, F1 layer, F2 layer) that may vary in height and ionization with season and time of day. The air particles in the ionosphere are ionized by the ultraviolet rays from the sun, and to a less extent by the charged particles from the sun.

Distribution of Ionized Constituents—The physicist Van Allen, states in his report to the Subcommittee of the Committee on Appropriations, House of Representatives, regarding the United States Rocket Program in the International Geophysical Year that the electrical nature of the atmosphere, particularly the distribution of various ionized constituents was given much study. Ionization oc-

⁴The Universal Standard Encyclopedia, Vol. 15 Leukosis; Mendelsohn, New York, Unicorn Publishers, Inc., 1954, Lightning, pp. 5323-5324.
⁵Webster's New Collegiate Dictionary.

curs by the absorption of ultraviolet and x-ray radiation of the sun and also by other agents such as cosmic rays and lower energy particles, and high speed meteors and micrometers.

Predominate Positive Ion: Nitric oxide, although a minor neutral constituent of the atmosphere was found to be the predominant positive ion in the E-region of the ionosphere, while atomic oxygen was found to be the predominate positive ion in the F-region.

Negative Ion: Above Fort Churchill the only negative ion detected was nitrogen dioxide. This indicates that most of the negative electrical charges, in balance with the positive ions, occurs as free electrons.

Free Electron Distribution—Mainly responsible for the ionospheric behavior affecting the reflections and propagation of radio waves, free electron distribution was studied and the electron concentrations measured at various levels during day and night. Confirmation of many previous ideas was obtained. It was determined, however, that in the region between 60 and 80 kilometers where increased ionization caused by solar disturbances is responsible for radio black-

outs, the collision frequency of electrons was lower by a factor of three than previously believed.

Theory of Chemical Background

The chemistry of the colloidal state of matter is of great importance in physiology and medicine⁶ because it concerns virtually every problem of the life processes, nutrition, digestion, secretion, and the more general problems of the body's structure and state of health.

It is really the charge of the adsorbed ions which causes the colloidal particles to move under the influence of a difference of electric potential. Since all the particles of one kind carry the same kind of charge, they will repel one another. High concentrations of ions tend to precipitate colloids.

Theory of Bacteriologic Background

It has been known for a long time that bacteria carry significant electrical charges⁷ but until comparatively recently the fact has not been useful in the study of bacteria. With the development of colloidal chemistry

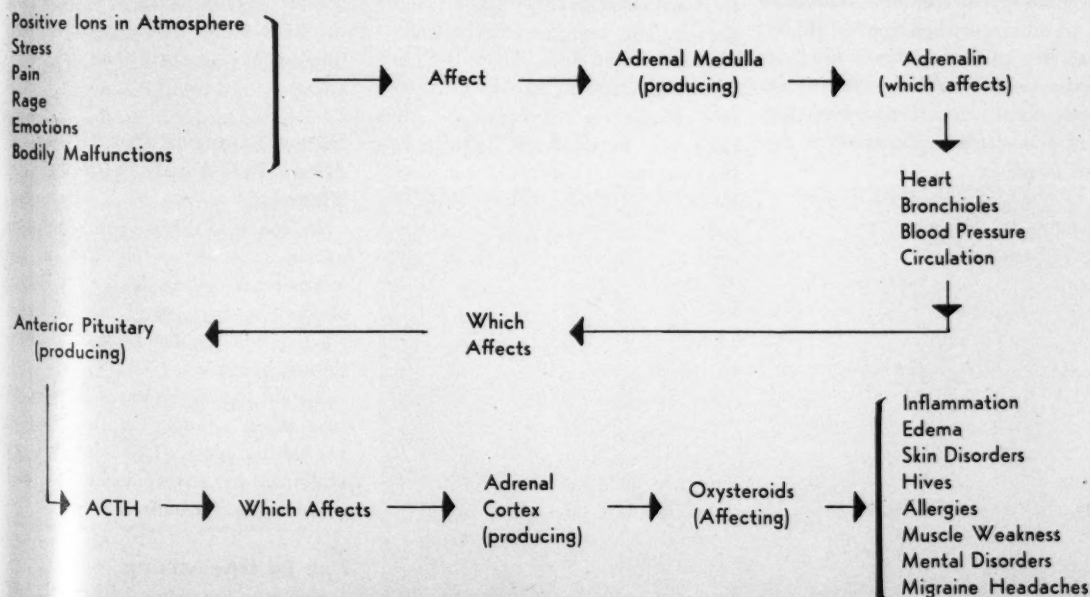
better understanding has developed of the various relations. A bacterial suspension is essentially a colloidal preparation, in which the bacteria, whether living or dead, bear the same relation to the surrounding menstrum as do the particles in a true colloidal suspension.

Accurate Method Needed—It is likely that there is no greater need in the science of bacteriology than that of a convenient and accurate method of expressing virulence. At present the only method available is that of saying that an approximate amount of bacterial growth will kill an animal of a particular size and kind in a given number of hours.

Estimation of Virulence—There is some reason to believe that the virulence of various strains of pneumococci is roughly proportional to the strength of the charge which they bear, inasmuch as the various types of pneumococci stand in much the same order in both aspects. It seems also that the phagocytes find it harder to engulf those organisms which

⁶Briscoe, Herman: General Chemistry for Colleges, Boston, Houghton Mifflin Company, 1939.
⁷Rice, Thurman, B.: A Textbook of Bacteriology, Philadelphia, W. B. Saunders Company, 1959.

STRESS CHART



have the higher potentials. For example, the rough strains of a given organism are self-agglutinative, carry low charges, and are highly susceptible to phagocytosis. They are likewise less virulent. When the charge on a culture is reduced by the addition of small amounts of immune serum, or a salt such as lanthanum nitrate, the organisms become more readily phagocytized, while on the other hand the addition of sodium oleate to the suspension increases the charge and makes them less susceptible to phagocytosis.

Localization of Bacteria—It is known that under certain conditions of cell and tissue injury there may be set up powerful electrophoretic fields, and it is not unlikely that this may be the reason why bacteria tend at certain times to localize in such areas of reduced tissue resistance. The mucous membranes of the nose are known to change considerably at different times in the hydrogen ion concentration of the secretion present and it may be assumed in such case, that the relative charge on the membranes may vary accordingly.

Positive Charge May be Carried—Under certain conditions the membranes carry a positive charge. This may explain the phenomenon observed by Arnold, who found that pathogenic organisms apparently quickly disappear from the nasal mucous membranes when applied there. *It may be that the negatively charged organisms are held by positively charged mucous membranes and that this is a possible explanation of invasive virulence.*⁸

Theory of Stress Background

Hans Selye states that every influence that bears upon man requires him to adapt himself to his circumstances,⁹ both outward events and internal emotions. As a technical framework for the disorders resulting from excess stress or from faulty adaptations to normal stress, Selye constructed what he called the *general adaptation syndrome*.

Definition—Reduced to its simplest form the general adaptation syndrome is an immediate response by the subject to a challenging situation, an alarm-mobilization for "fight or flight."

Symptoms—Response is marked by changes in body temperature, blood pressure, and blood sugar. The initial phase may last from moments to hours. It is followed by mobilization and countershock by the body through an increased supply of adrenal hormones under the stimulus of the pituitary gland. This stage is marked by increased resistance to stress.

Adaptation Temporary—By the nature of its origin, the adaptation syndrome cannot last indefinitely, for if the adrenals remain overactive and resistance is lowered or exhaustion intervenes, any of the diseases of adaption, hypertension, peptic ulcer, arthritis may result.

Unified Theory in Brief

The air we breathe has a constant electrical charge which may vary from 100 volts per meter potential in fair weather to millions in a storm. Not only does the potential vary but when the barometer drops, the charge consists of positive ions and in fair weather, negative ions. Inasmuch as bacteria are negatively charged, they are attracted by the upper respiratory tract which is positively charged by the air. The second concurrent effect may be one of stress where the positive ions charge the blood with a positive charge via the lungs and thus raise the temperature by affecting the temperature control center directly. When the temperature rises, the pulse and respiration also automatically rise. This probably accounts for physical changes during a severe change in the weather. It is well known that a heart attack will cause an elevated temperature due to heart tissue damage. The effect is therefore believed to be the same although no actual tissue damage is present because, as mentioned previously, injured tissue has a positive charge.

Stress Mechanism Involved—Experimental evidence also seems to show that when the patient with a skin disease, or hay fever is placed

in an artificial negative ion atmosphere the condition improves. This also tends to indicate that the stress mechanism is at play in reverse in this situation.

Some Clinical Problems in Dentistry Explained by Theory

1. Infection of an injured incisor with no opening into the mouth. This paradox can be explained by considering that the injured tissue is positive and bacteria in the blood will be attracted to it.

2. Nonvital tooth may become tender during change in weather. This can be explained on the basis of stress factor from positive ions causing resultant edema and inflammation.

3. Toothache following "flu." This can be explained by stress produced by flu to lower resistance and produce inflammation and edema.

4. Patient having much more post-operative complications with one extraction than with a similar one at another time. This is probably due to stress factor caused by change in the weather.

5. So-called Costen's syndrome which might occur for no apparent reason. This has been blamed on emotions, malocclusion. I personally have had this condition and it seemed to me that it came about during severe changes in the weather. I would say the stress factor had much to do with this condition rather than malocclusion.

Some Clinical Problems in Medicine Explained by Theory

1. Bouts of rheumatoid arthritis which occur when changes in the weather take place. This can be explained by both stress factors from positive ions in the body and invasion of bacteria.

2. Old healed fractures tending to ache when changes in the weather are taking place. This also can be explained by stress mechanism and positive ion formation.

Use in Operatory

It is now possible to charge the air
(Continued on page 228)

⁸Ibid.
⁹Cayer, David: The Ruinous Tenant, Torch Magazine 4:32 (Oct.) 1947.

The Clinical Application of ORTHOPERIODONTICS

JOHN B. PUCKETT, D.D.S., El Paso, Texas

DIGEST

An interlocking problem that is becoming widely recognized is the frequent necessity of orthodontic treatment in periodontal cases. This is particularly true of the adult maxillary incisors in which are seen many of the aberrations from the normal: splayed-out teeth, crowded overlapping, and cross-bites in which the upper anteriors are within the incisal arc of the mandibular teeth. This illustrated article describes the possible movements of the teeth and presents a step-by-step procedure for the correction of malposition.

Possible Explanation Of Condition

Although Begg¹ states that the normal bite is end-to-end, in the generally accepted concept of normal occlusion² the maxillary arch in centric overextends the mandibular arch. The overbite thus produced supposedly contains the passive eruptions of the mandibular incisor teeth and constricts their labial expansion.³

When the mandibular teeth prove to be stronger and act as forcing wedges against which the maxillary teeth are traumatized, there is a resultant movement in the upper arch with consequential resorption of the

alveolus. This could be an explanation of periodontosis.⁴

Seven Movements Of Incisors

According to Tweed,⁵ there are seven movements possible for the incisor to take:

(1 and 2) Labial (ventro) and palatal (dorsal) swing on the sagittal plane.

(3 and 4) The mesial and distal movements.

(5 and 6) The elongative and apical movements.

(7) The rotative movement on its own axis.

All seven movements are represented in one form or in combinations in

the arch that requires *orthoperiodontics*.

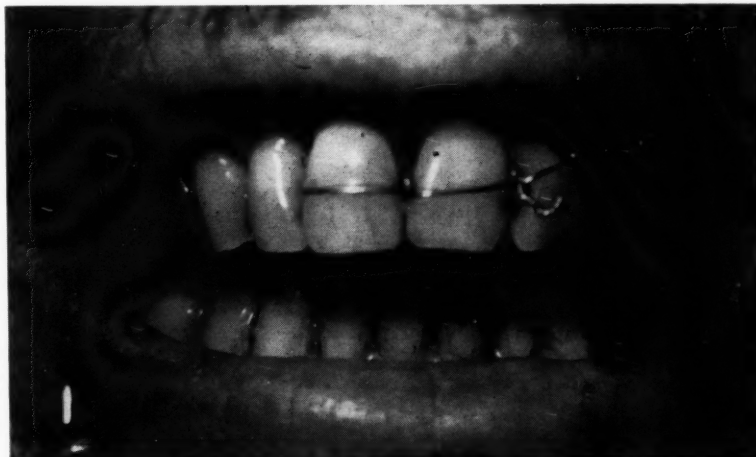
Splaying-Out—The movement most frequently observed is best described as *splaying-out* which is movement toward the labial, and additionally, a movement that usually is distal to the midline.

Causes: This may have come about (1) from a weakening of the alveolus from periodontal conditions, (2) from a closing bite with resultant pressure by the lower incisors, or (3) from causes that are obscure.

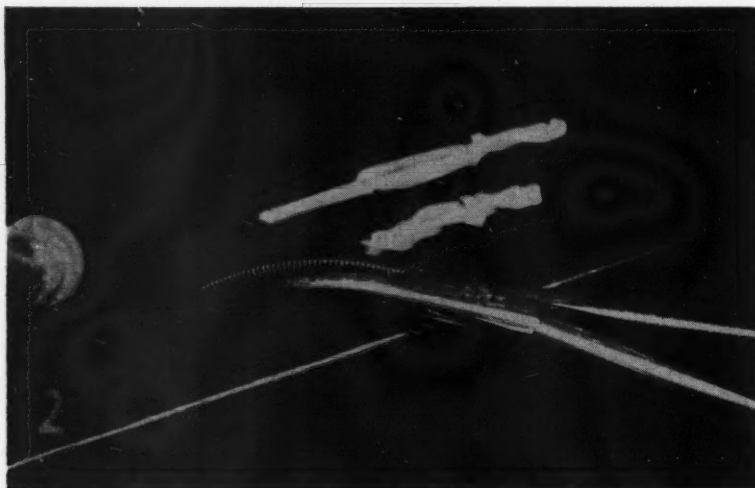
Therapy: Periodontal treatment should be instituted with concurrent traction and the following measures completed:

1. Stable anchorage is selected, usually a molar and/or bicuspid. A 28-gauge stainless steel wire loop is made around the anchor teeth, with a small hook fabricated from the ends of the wire (Fig. 1).

2. The incisors are ligated so that the proper pressure can be applied by elastic ligatures. S.S. White Assortment 240-Y contains large and small



1.
Use of tails of anchor wires for hooks is shown.



rubber bands that can be readily interlaced together by use of a mosquito forcep (Fig. 2).

3. Traction, with changes in the rubber bands every three days as they lose their elasticity is continued until the desired retraction of the teeth is achieved.

4. Wire ligations are maintained for a minimum of six months. This permits the bone to begin to stabilize. Later, if retainers seem to be necessary, they can be used to replace the wire ligation.

Crossbite—This movement is occasionally seen. If it is a true neutro-occlusion, modification can be effected by using an archwire about the size of a paper clip, anchored at the

2. **Mosquito hemostat and method of lacing rubber ligatures are shown.**

3. **Gem clip wire used as arch wire. Twenty-eight-gauge ligatures are placed around bicuspid for retention.**

4. **Distal tilting of upper centrals. Preoperative view.**

5. **Distal tilting of upper centrals. Postoperative view.**

6. **Diastoma caused by frenum, preoperative view.**

7. **Postoperative result of frenectomy.**

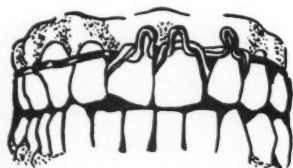
Mesial and Distal Movement of the Incisors—Sometimes this movement can be controlled by hook appositioning and swinging the wayward teeth into their vertical root-axes.

Treatment Required—Often it is necessary to apply the entire procedure of anchorage and rubber traction as described previously. Roots of such teeth will move either in a tilting manner or be successfully moved vertically. In either case, the objectives (esthetics and brushing ease) are attained (Fig. 5).

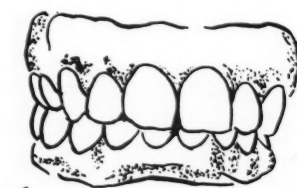
Surgical Measure—In the mesio-distal movement, the frenular muscles frequently have a major role, and should be excised from the incisal papilla to the gingival attachment. The ligament is cut away from the papilla down to the bone and the cementum of the approximating roots (Fig. 6). This simple operation, alone, will often correct the diastoma and permit the centrals to assume their normal position in the arch (Fig. 7).

Apical Movement—This movement requires many times as much effort as an ordinary movement;⁶ for the patient, it is well worth the time and trouble invested. The movement is accomplished by sling action of the rubber band. The effect, tooth wiring for traction, and ligation are shown in Figures 8, 9, and 10.

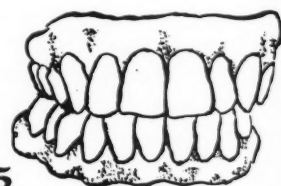
⁶Tweed, op. cit.



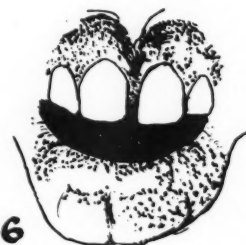
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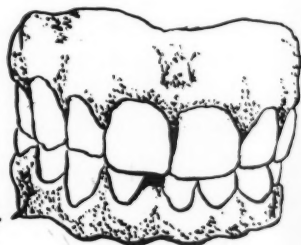
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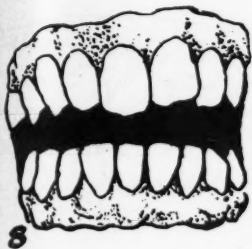
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7

posterior. Rubber ligatures will bring the incisors into position labially (Fig. 3).

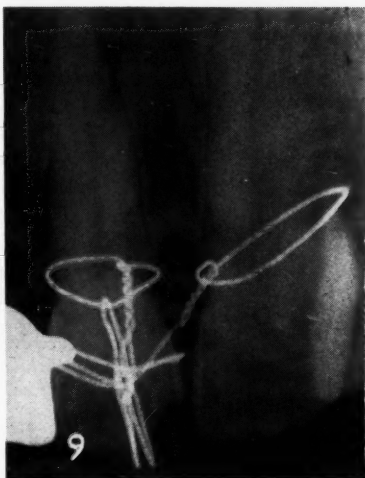
Note that this method will create a diastomatic condition, but psychologically and physiologically, the effect is more satisfactory than the original distocclusion. A so-called *rodent bite* can also be corrected by this method.



Additional Time Required: Although so much more tractive force is necessary, the pressure is just the same as in other movements. The difference lies in the time required.

Trauma Avoided: Overexertion can cause resorption of the apex of the moving root from trauma. This must be avoided. Frequent x-rays to see if the root tip is flattening will show if the tractive effort is excessive.

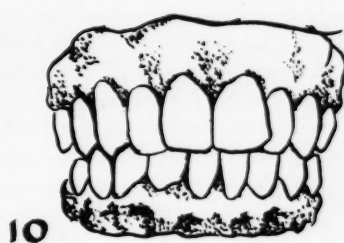
Rotation—The final movement, that of rotation, does not readily yield to this simple technique. With wiring alone the tooth cannot be grasped tightly enough so that it can be turned on its axis. Banding in the ortho-



8. Preoperative view showing apical movement of right central.

9. Shows method of ligation around incisal of the tooth, utilizing tails for hook. This x-ray view was taken during the period of stabilization by wire ligation.

10. Postoperative view. Apical movement of right central.



dox orthodontic manner is the method of choice in such cases.

Maintaining Retention

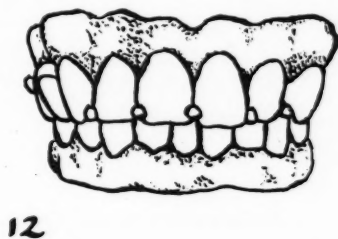
Attention is called to the problem of retention of the teeth after correct position is attained. In the simpler movements, wire ligation for a period of six months usually will assure stabilization and a partial regrowth of the bone.

Bite-raising Appliances—As mentioned before, in the splaying cases bite-raising appliances often are necessary. In the appliance finger retainers for the incisors can be readily incorporated (Fig. 11). These will hold

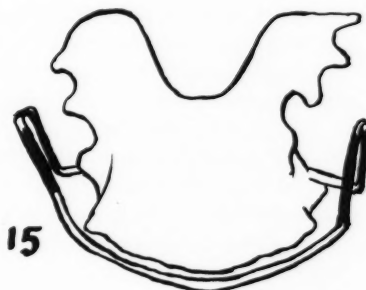


11. Upper retainer utilizing fingers interproximally shown on cast.

12. Appearance of upper retainer in mouth. Note small amount of metal



12.



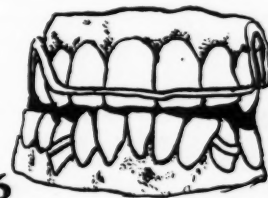
displayed interproximally at incisal.

13. Upper retainer of spring type (casting).

14. Upper retainer shown in the mouth.



15.



16.

Note that it is much more apparent than the finger method.

15. Hawley splint.

16. Hawley splint in mouth.

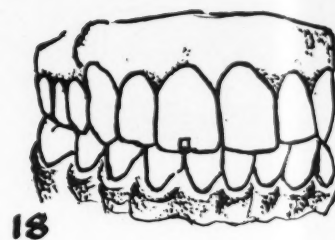
the teeth in position without further necessity of wiring and can be considered permanent as long as the appliance is worn (Fig. 12).

Spring Retainer—An occasional spring retainer (Fig. 13) has also been employed in the splayings and in mesiodistal movement, although probably the Hawley type is the one of choice for this method (Figs. 14, 15, and 16).

For the apical movement's retention a vertical finger is preferable to the wire sling (Figs. 17 and 18).

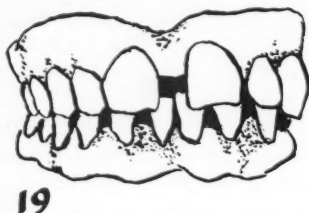


17.
Retainer for apically moved incisors with metallic bar that will pass below the incisal and avoid the lower incisors.



In most cases this is worn as a retainer during sleep.

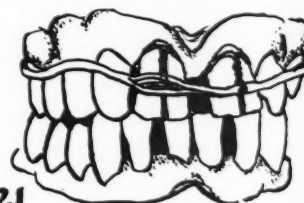
18.
The retainer shown in the mouth.



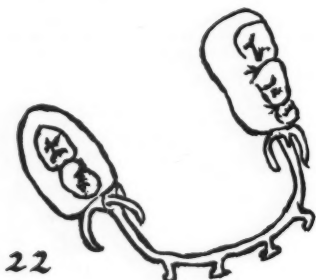
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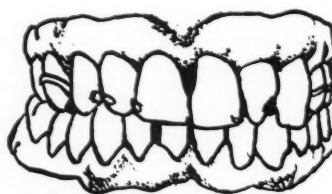
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21



22



23



24

19.
Case History One. Preoperative view.

20.
Case History One. Profile view showing rubber ligatures beginning to be effective. The incisors have been wire ligated as shown in Figure 9.

21.
Case History One. Full face view of traction shown in Figure 20.

22.
Case History One. The retainer, occlusal view.

23.
Case History One. Retainer shown in the mouth, front view, postoperative result. Compare this view with Figure 21.

24.
Case History One. Postoperative view of profile with retaining fingers visible. Compare this with Figure 20.

Conclusions

All the movements except rotation are readily amenable to wire and rubber band traction. Sometimes rotation, too, can be achieved in this way.

Retention and remedial appliances can be constructed promptly after movement of the teeth into the desired position. If no appliances are made wire retention should be continued for a minimum of six months.

Orthoperiodontics gives the patient a better opportunity for home care and enhances his morale through improved appearance.

Case Histories

Case One—A woman in her early

40's had badly splayed-out teeth with separation as in periodontosis. The patient was a widow who had lost interest in life but who had been persuaded to come for periodontal treatment (Figs. 19 and 20). Much more persuasion was necessary to convince her she required the movement of the teeth for periodontal reasons alone, but she finally agreed.

Treatment—(1) Traction was instituted and completed five months later (Fig. 21).

(2) Partials that raised the bite were constructed with retaining fingers, as shown in Figures 22, 23, and 24.

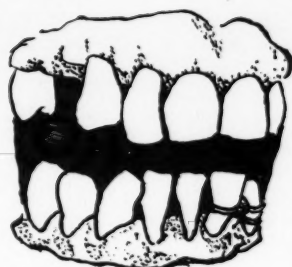
Case Two—The dental condition of

25.
Case History Two. Preoperative three-quarter view.

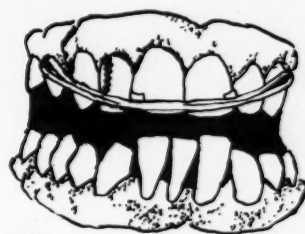
26.
Case History Two. Original traction shown.

27.
Case History Two. Subsequent traction. Hooks are shown from loops extending from the centrals at midpoint and a wire hook from a loop around the first bicuspid. This makes a triangle of rubber traction. More pressure can be built up ultimately by adding the gingival rubber band to the retaining hook on the lateral that is already carrying the incisal portion of the rubber band.

28.
Case History Two. Wire-retaining ligation following virtually the same form as the rubber traction.



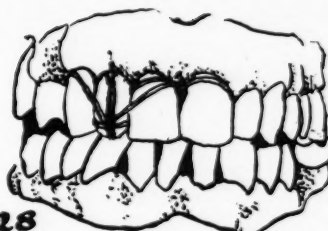
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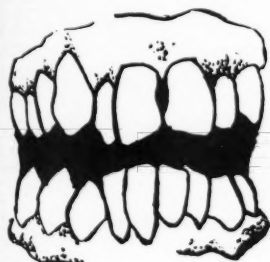
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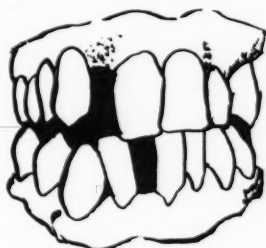
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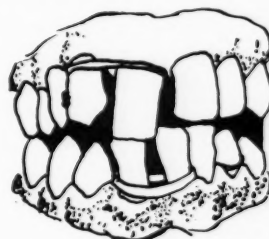
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29



30



31

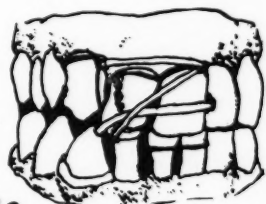
29.
Case History Three. Preoperative view.

30.
Case History Three. Patient shown after extractions.

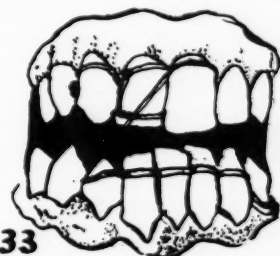
31.
Case History Three. Application of rubber ligatures, early stage.

32.
Case History Three. Application of rubber ligatures, secondary stage.

33.
Case History Three. Wire ligation, retentive stage.



32



33

(Fig. 27). This proved efficacious to both the recalcitrant lateral and the central. Traction was continued for several months (Fig. 28).

Case Three—The patient in this case was a man in his early 30's. His dental condition was poor both from a periodontal and a mechanical standpoint (Fig. 29). Caries were rampant.

Treatment—Orthoperiodontic success depended upon the viability of the upper right cuspid, which had a large Class III distal cavity. This tooth was salvaged. It was then decided that the upper right lateral and lower right central should be extract-

ed and their spaces utilized for the correction of the two arches (Fig. 30). Traction was applied concurrently to the two arches. This measure proved successful (Figs. 31 and 32).

Difficulty Encountered—Difficulty was encountered in the attempted mesial movement of the lower right cuspid which never quite reached the desired position. Satisfactory fixation was achieved, however, and the lowers were ligated. Time involved for the movement was three months (Fig. 33).

1501 Arizona

a woman in her early 30's was that of a generally crowded mouth (Fig. 25). The lower left central had already been extracted and the teeth moved to close the gap (Fig. 25).

Treatment—(1) After a month of traction, the upper teeth were aligned, and ligated (Fig. 26).

(2) When seen two months later, the right lateral had drifted and a different type of traction was applied

Clinical Applications

of OCCLUSION and ARTICULATION-

Part Five

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DIGEST

In previous installments the theoretic principles were discussed and the mechanical means and associated technical procedures were presented for a novel method which can be used for the study, diagnosis, treatment-planning, and execution of procedures concerned with balanced occlusion of the teeth in harmony with the articulations of the jaws. In this installment step-by-step directions are given for the clinical application of the technique as demonstrated in the construction of a set of full dentures.

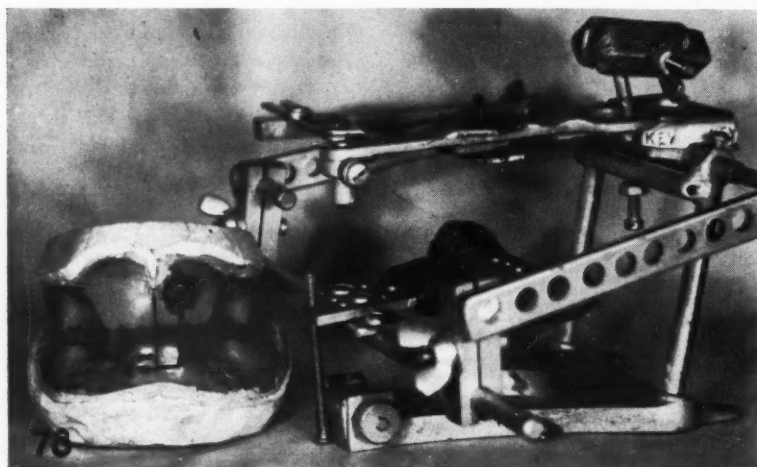
Initial Measures in Technique

The method presented here employs the occluded maxillomandibular relations of casts or appliances mounted on an articulator, as determined with interocclusal wax bite records ob-

tained from a patient, to duplicate the recorded maxillomandibular relations. These duplicated relations are used as a practical, simple, and effective substitute for the patient's mandibular movements, as regulated by the temporomandibular articulations.

Clinical Procedures Before Processing Dentures

In this illustrated description the order of the procedures to be completed is arranged so that the use of the articulator can be shown to the best advantage. In practice, many variations in the sequence of the steps may be introduced. In addition to the procedure illustrated here there are many other factors concerned in the construction of dentures which are not included although the author does not minimize the importance of these other considerations. The successive steps to be completed before the dentures are processed and completed are illustrated in Figures 78 to 87.



Esthetic Requirements Fulfilled —
The shape and form of the anterior teeth are determined by the esthetic requirements of the patient. The following factors should be considered:

1. Posterior teeth with shallow cusps are considered most desirable.
2. Steep cusped teeth are destruc-

78.

The articulator with the mandibular hinge-axis relator record and the casts with the centric relation bite record in place. These are all the requirements for mounting the casts and setting up the teeth of the dentures. The adjustable parts of the articulator are shown in their centric starting relationship, as determined by the centric relation key properly in place on the articulator.

79.

The upper cast is seated and secured in the relator, which is correctly engaged to the articulator. Note the hinge-axis pins of the articulator extended to engage the relator. The occlusal plane indicator of the relator is made parallel to the base of the articulator with the screw seen in front of the incisal table.

80.

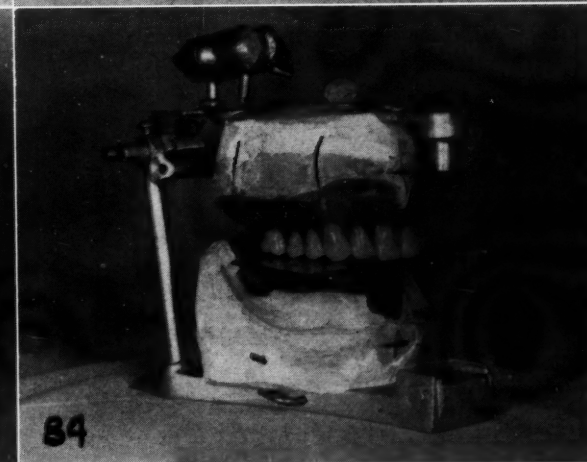
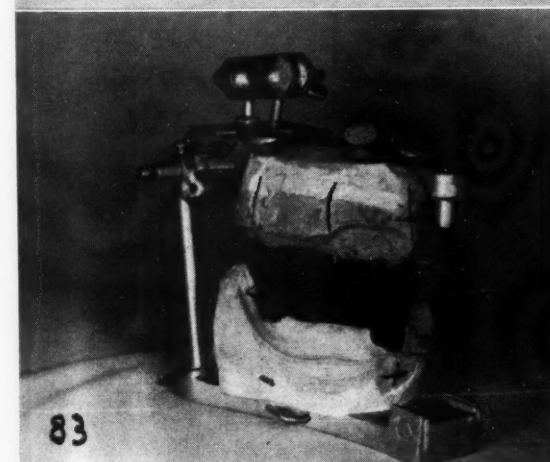
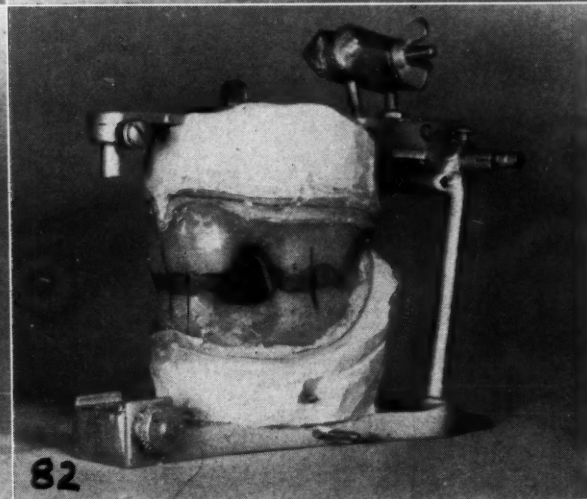
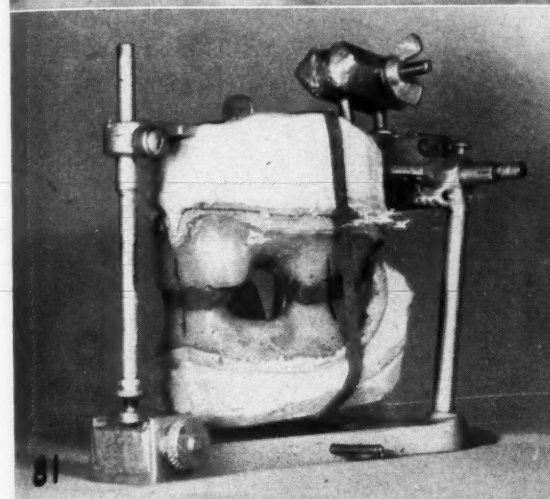
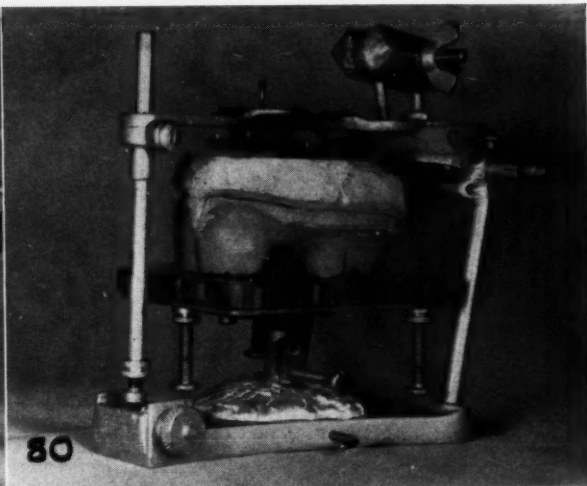
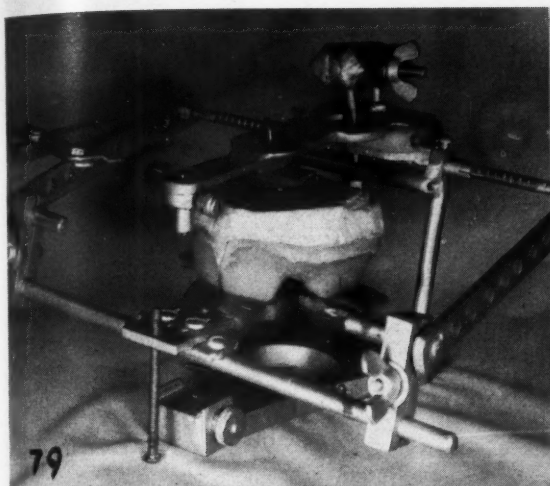
An alternate satisfactory method for relating the upper cast for mounting on the articulator. The cast is shown properly placed on an adjustable mounting device. This method for mounting is used when, for some reason, the relator record is unavailable.

81.

The upper cast is attached to the upper cast holder of the articulator. The relator is removed. The lower cast is related and fixed to the upper cast, with the centric relation bite record. A rubber band is used, if necessary, for supporting the casts. The lower cast is now attached to the lower cast holder.

82.

The upper and lower casts are shown properly mounted on the articulator with respect to their centric relation to each other and with respect to their relative disposition to the mechanical hinge-axis of the articulator. The teeth can now be set up in accordance with accepted practice.



83.

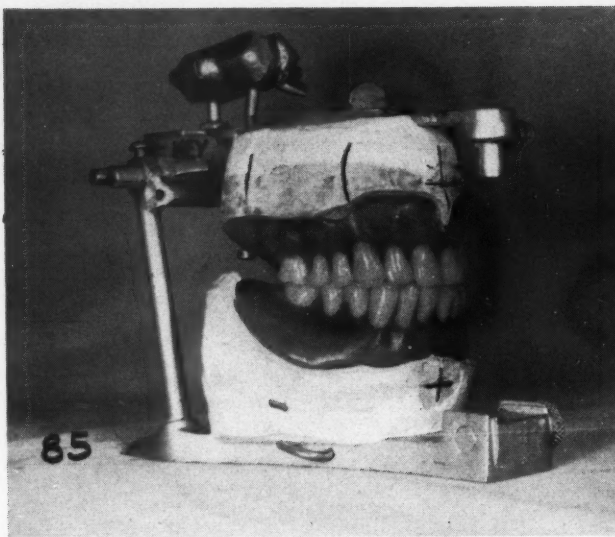
A glass or transparent plastic plate which is used as a guide for setting up the teeth. It is supported by three pyramids of wax on the lower cast. The anterior portion of the plane of the glass is determined by the lip line pre-

viously established on the bite block in the patient. With the anterior part serving as a pivot, the posterior areas of the plate are adjusted so that the plate approximately divides the space between the jaws. Usually, this plane will be parallel to the base of the articulator.

It is the most desirable starting plane of orientation for setting the teeth. It may have to be altered, however, after the set-up is checked in the patient.

84.

The upper set-up completed in accordance with the method described.



85.

The full set-up of the teeth completed. The lower teeth were set to conform to the upper teeth. Anteriorly, from cuspid to cuspid, the lower teeth are set slightly out of contact with little or no overbite and at least a small degree of overjet, if it is possible to do so.

86.

A view of the anterior section of the set-up showing the desirable clearance for the anterior teeth of the set-up.

87.

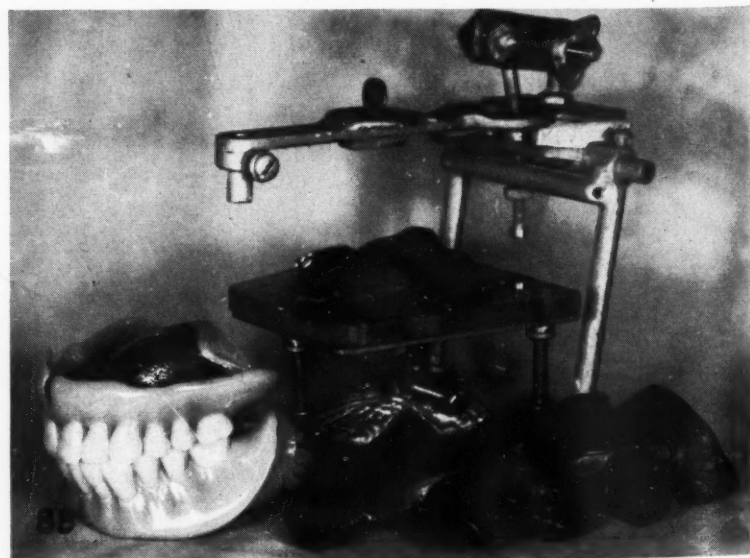
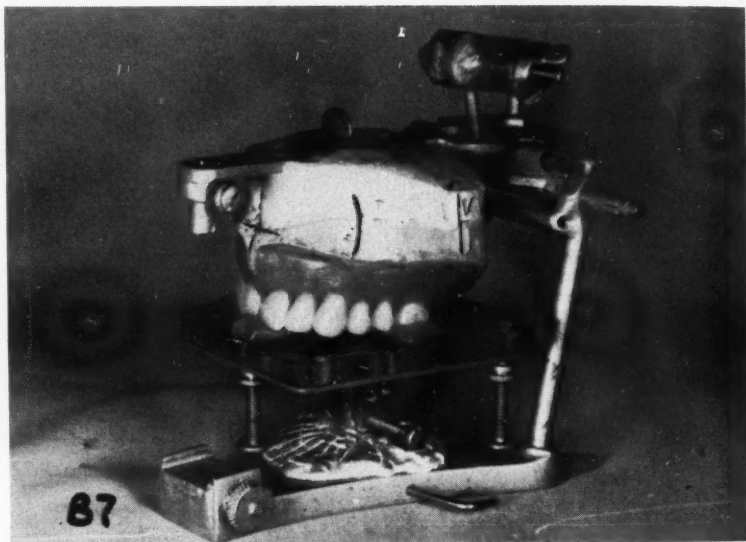
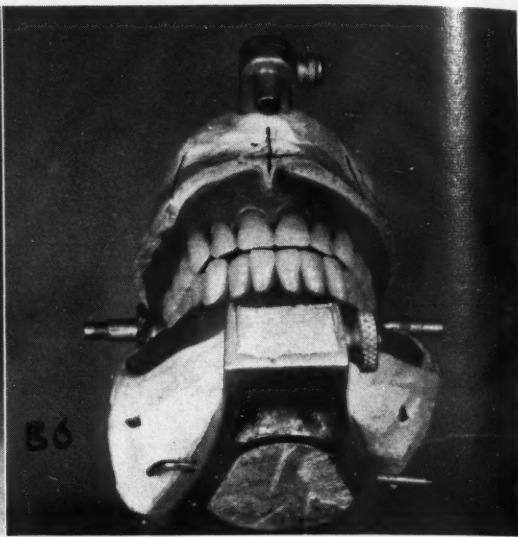
The upper denture seated in an index made on a mounting device placed in the articulator. The waxed-up dentures can be carefully processed and completed in accordance with sound laboratory practice.

88.

The articulator, previously made index, completed dentures, and the centric, protrusive, right and left lateral bite records obtained from the patient. These are the essential technical requirements for adjusting the occlusion of the teeth to be in harmony with the articulations of the jaws of the patient. The adjustable elements of the articulator are releasably secured in their starting centric relation, predetermined by the presence of the centric relation key in its proper place.

tive in their effects, regardless of how well they are balanced. They should also be as narrow as possible buccolingually.

3. For dentures, the second molar teeth are generally useless and eliminated from the set-up. When the jaws are large they are included.



Guide for Setting Teeth with Reference to Plane of Occlusion—A glass or transparent plastic plate is used as a guide for setting up the teeth (Fig. 83). Looking down vertically through the transparent plate a wax china-marking pencil can scribe a line on the plate indicating the vertical projection of the crest of the lower ridge. The established plane and the ridge line can be used as a guide for setting up the teeth with reference to a plane of occlusion and the lower ridge.

Teeth in Relation to Plate—The occlusal and incisal tips of the upper teeth from the second bicuspid of one side to the second bicuspid of the other side are set against this plate. For esthetic reasons the laterals can be excepted. Only the mesiolingual cusps of the first molars touch the plate. The buccal and distolingual cusps are tipped slightly upward away from the plate at about a 10 to 15-degree angle.

Arch Form Determined—Angulation of the first molar is continued in a graceful curve when setting the second molars, if they are used in the set-up. The arch form of the teeth in the set-up is determined by the form of the patient's arches.

Modifications May be Required—After the teeth are set up they can be inserted and checked for the accuracy and correctness of pertinent details, such as esthetics, phonetics, and vertical dimension. It is of particular importance to verify the balance of the occlusion and its harmony with the centric relation of the jaws of the patient.

Note—At this time no attempt is

made to balance the occlusion of the teeth to harmonize with the patient's occluded eccentric maxillomandibular relations. Only the harmony of the occlusion of the teeth with the centric relation of the jaws is considered at this time.

Later Adjustments Minimal—It would be useless to balance the occlusion completely at this time because of the changes in the relationship of the teeth which occur when the dentures are processed. If the teeth are set up in accordance with previously described principles, the subsequent occlusal adjustments required after the dentures are processed will be kept to a minimum.

Wax-up Completed—After the set-up has been checked in the patient and found to be satisfactory, the wax-up is completed.

Relationship Preserved—An index of the relationship of the upper denture to the hinge-axis of the articulator is made. This preserves this relationship for subsequent use when remounting the dentures after they have been processed in the laboratory. The mounting device is used for making the index.

Clinical Procedures for Balancing the Occlusion

The articulator, previously made index, completed dentures, and the

centric, protrusive, right and left lateral bite records obtained from the patient are the essential technical requirements for adjusting the occlusion of the teeth in harmony with the articulations of the jaws of the patient (Fig. 88). The adjustable elements of the articulator are releasably secured in their starting centric relation, predetermined by the presence of the centric relation key in its proper place.

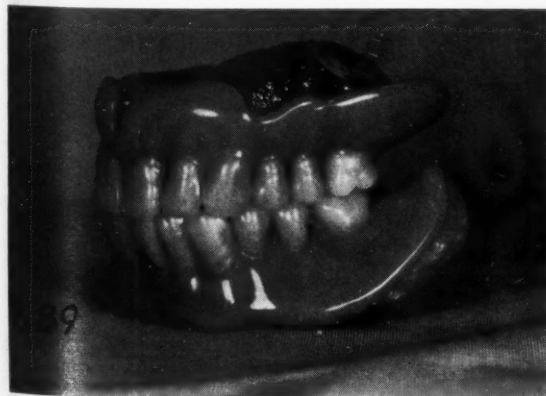
Preliminary Laboratory Steps in Mounting the Dentures

Before the patient's visit to the office the following laboratory procedures are completed:

1. The dentures are completed (Fig. 89).
2. The undercut areas of the dentures are blocked out with a suitable material, such as plastolene (Fig. 90).
3. Plaster bases are made in the dentures to facilitate mounting of the dentures on the articulator (Fig. 91).
4. The upper denture and its base is properly placed and secured into the previously made index (Fig. 92).
5. The upper denture is mounted on the articulator. The index assures its proper relationship to the hinge-axis of the articulator joint (Fig. 93).
6. The lower denture and its base is related and secured to the upper denture. The existing occlusion of the teeth is used for a guide in relating the dentures. The lower denture is mounted on the articulator. In practice, the dentures are related to each other with the centric relation bite record. This will be described later.
7. The upper and lower dentures

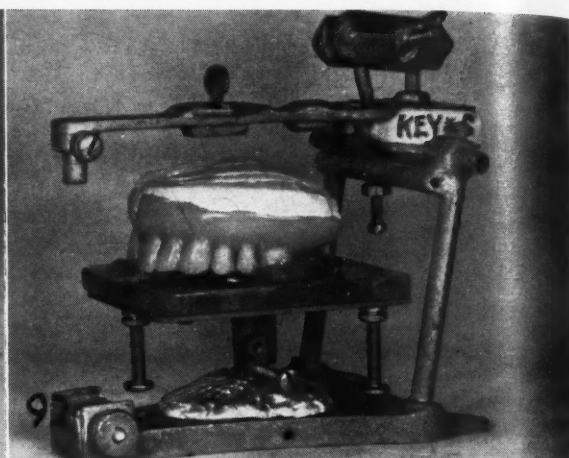
89.
The completed dentures.

90.
The undercut areas of the dentures are blocked out with a suitable material, such as plastolene.

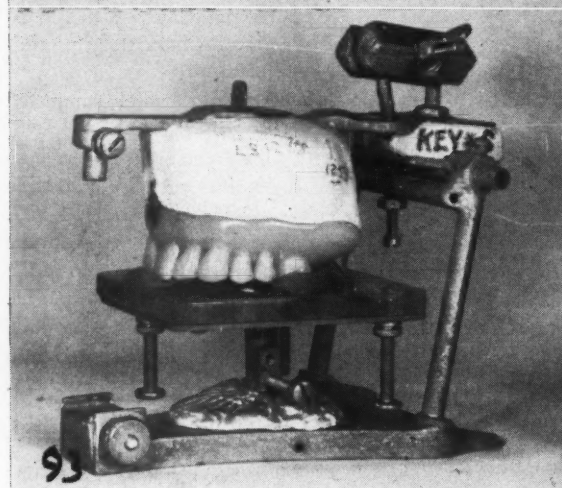




91



92



93



91.
Plaster bases are made to the dentures to facilitate mounting the dentures on the articulator.

92.
The upper denture and its base is prop-

erly placed and secured into the previously made index.

93.
The upper denture mounted. The index assured its proper relationship to the hinge-axis of the articulator joint.

94.
The lower denture and its base related and secured to the upper denture. The existing occlusion of the teeth is used for a guide in relating the dentures. The lower denture is mounted on the articulator.

95.
The upper and lower dentures mounted in the articulator.

96.
The universal clamp joint is unlocked. This releases the upper cast holder for universal movement.

97.
The upper cast holder is moved away from the centric relation key of the articulator.

98.
The articulator's centric relation key is removed and set aside.

99.
The centric relation bite record obtained from the patient is interposed between the dentures. It is shown seated on the lower denture.

are mounted on the articulator (Fig. 95).

Note—The dentures are not considered correctly related to each other with respect to their proper centric relation. The inherent discrepancies always caused during the processing of the dentures are responsible for this. Clinical procedures which are to be described will correctly relate the dentures to each other with respect to their proper centric relation.

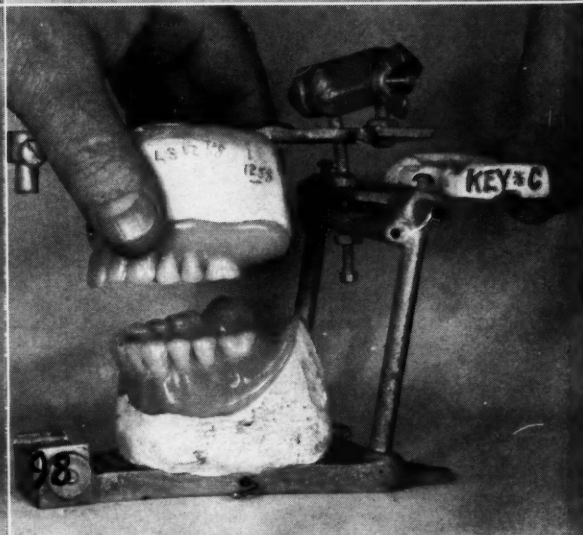
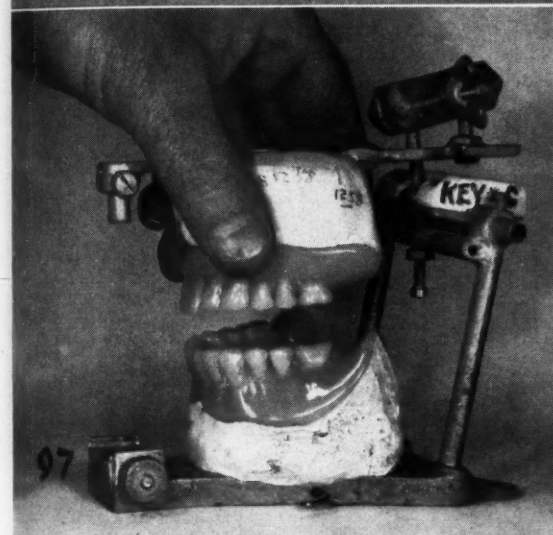
8. After the dentures have been mounted on the articulator, they are removed from the cast bases, cleaned, and made ready for obtaining the nec-

essary variety of essential bite records required for the subsequent articulator adjustments.

9. Usually, two centric relation bite records and one each of the protrusive, right and left lateral relation bite records are required. The bite records are made with the completed dentures in the mouth in the manner previously described for making the three-point interocclusal wax bite records.

Correcting the Centric Relation

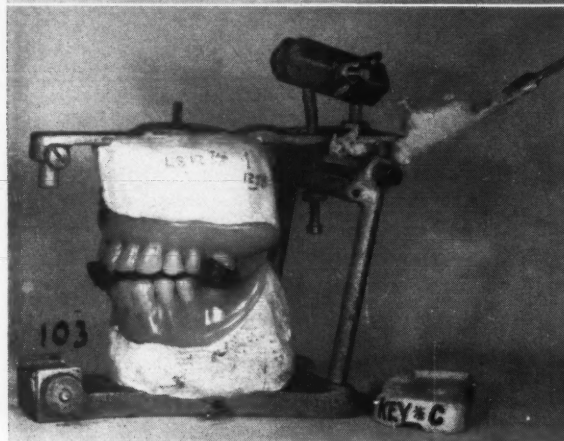
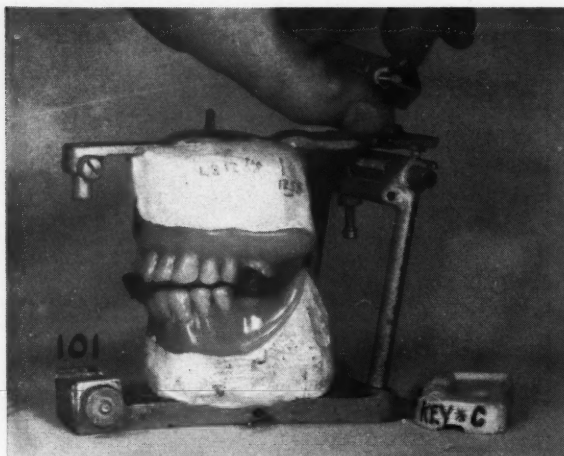
After the centric relation bite rec-



100.

The upper denture is properly seated into the centric relation bite record and gently secured against the lower denture with the pressure of the hand as

shown. The dentures are properly and correctly related to each other with respect to their centric relation.



101.
The universal joint clamp is locked, releasably securing the centric relation of the dentures mounted on the articulator.

102.
The combined operation of relating the

dentures and releasably securing the relationship on the articulator, as it is accomplished in practice.

103.
Quick setting plaster (or artificial stone) is being interposed between appropriate key plates on the articulator. The dentures with the centric relation

bite record properly seated between them are releasably secured on the articulator.

104.
The new centric relation key trimmed and in place. The original centric relation key is also seen next to the articulator.

ord is obtained from the patient the centric relation of the dentures mounted on the articulator are corrected in the following manner:

1. The universal clamp joint is unlocked (Fig. 96). This releases the upper cast holder for universal movement.

2. The upper cast holder is moved away from the centric relation key of the articulator (Fig. 97).

3. The articulator's centric relation key is removed and set aside (Fig. 98).

4. The centric relation bite record obtained from the patient is interposed between the dentures. It is

shown seated on the lower denture (Fig. 99).

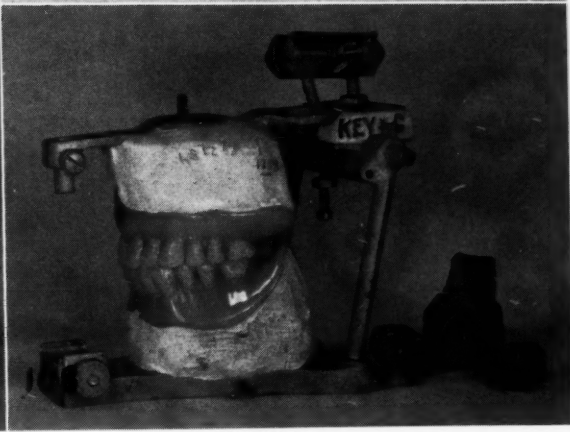
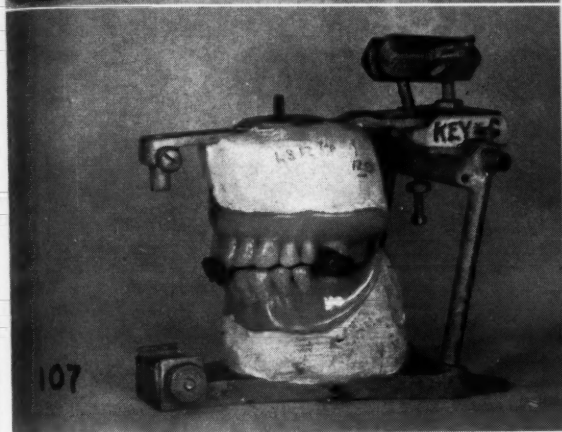
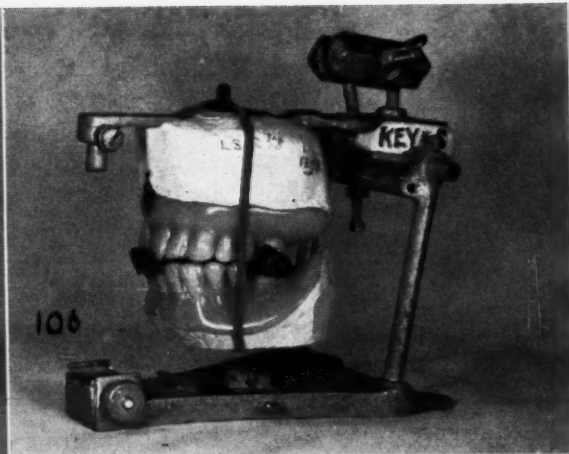
5. The upper denture is seated into centric relation bite record and gently secured against the lower denture with the pressure of the hand as shown in Figure 100. The dentures are properly and correctly related to each other with respect to their centric relation.

6. The universal joint clamp is locked, securing the centric relation of the dentures mounted on the articulator (Fig. 101).

7. The combined operation of relating the dentures and releasably securing the relationship on the artic-

ulator as it is accomplished in practice is shown in Figure 102.

Occluded Relationship Observed—With the centric relation of the dentures releasably secured on the articulator, the centric relation bite record can be removed. The occluded relationship of the opposing teeth can be observed and studied. The relation of the dentures can be checked and verified with a different centric relation bite record interposed between the dentures as often as is considered to be necessary. If the releasably secured relation is incorrect, it can be altered, readjusted, and be releasably secured again with a different



105.

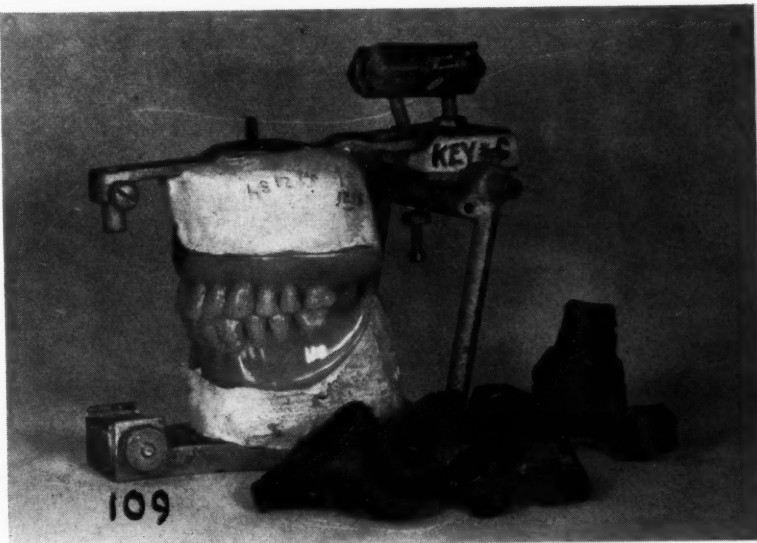
The dentures correctly related to each other with respect to their centric relation and with respect to the axis of the pivotal joint of the articulator. After the new centric relation key has been made on the articulator the centric relation "bite" record is removed and can be discarded.

106.

The upper denture was mounted on the articulator in the manner described. The lower denture and its base is related and secured to the upper dentures with the centric relation bite record obtained from the patient. A rubber band secures the relation of the dentures. The lower denture is attached to the articulator. Note the original starting centric relation key of the articulator in place. In practice, this mounting procedure is used in order to avoid the necessity for making a new centric relation key on the articulator.

107.

The upper and lower dentures are mounted on the articulator with their correct centric relation with respect to each other and with respect to the hinge joint of the articulator. The centric relation bite record is still in place.



108.

The same as shown in Figure 107, but with the centric relation bite record removed. The original centric relation key of the articulator is the mechanical substitute for the bite record.

109.

The same as shown in Figure 108, but with the essential bite records required for adjusting the articulator for carrying out the procedure concerned with the necessary occlusal adjustments.

relation. This is done in the way just described.

Useful Feature — The ease with which the articulator can be adjusted for altering the occluded maxillo-mandibular relation of the mounted casts or appliances, as determined with the bite records, is considered to be one of its chief recommendations.

New Key Made—If the releasably secured centric relation of the dentures is considered to be correct, a new centric relation key is made on the articulator. This key will then be the mechanical substitute for the centric relation bite record and the articulator record for the centric relation of the dentures. This key is made in the following manner:

1. The dentures with the centric relation bite record properly seated between them are releasably secured on the articulator. 2. Quick setting plaster (or artificial stone) is interposed between appropriate key plates on the articulator (Fig. 103).

The new centric relation key trimmed and in place is shown in

Figure 104. In Figure 105 the dentures are shown correctly related to each other with respect to their centric relation and with respect to the axis of the pivotal joint of the articulator. After the new centric relation key has been made on the articulator, the centric relation bite record is removed and can be discarded.

Eccentric Maxillomandibular Relations

In the manner just described, any of the eccentric occluded maxillomandibular relations of the dentures, as determined by the bite records obtained from the patient, can be releasably secured on the articulator. The occlusion of the opposing teeth of the dentures can be observed and studied. If any of the recorded eccentric relations are undesirable, new bite records can be made and used. The process can be repeated as often as desired.

Eccentric Articulator Keys—Articulator keys can be made for any of

the eccentric relations of the dentures in a manner similar to the technique shown for making a new centric relation key.

Bite Records can be Used—While it is desirable to have articulator keys or records available before any occlusal adjustments are made, the bite records themselves can be used for adjusting the articulator.

Key an Invaluable Adjunct — In practice the centric relation articulator key is considered to be essential as a means for recovering the centric relation of the dentures after this relation was altered for making the eccentric relation occlusal adjustments.

Modification Introduced—In practice, in order to avoid the necessity for making a new centric relation key, the dentures are mounted on the articulator in their centric relation as determined with the centric relation bite record obtained from the patient.

(End of Part Five)

246 Woodmere Boulevard

A Theory Regarding The Effects of Atmospheric Ionization

(Continued from page 214)

negatively rather simply by installing devices which contain ultraviolet bulbs and which by means of a fan draw the room air over the bulbs and withdraw it again after passing through a regular filter. Essentially this is what happens in the ionosphere except that this is on a smaller scale. Of course ozone is produced and the actual air is somewhat germicidal. This device is sold commercially as a room deodorizer and also for use in hay fever and other allergies.

Experimentation—The author has experimented for two months and has not had a single cold even though changes in the weather were quite severe and would usually result in a bout with a virus. Also the usual patient load was present to grossly contaminate the room and himself. It is too soon to evaluate this effect but so far it seems efficacious.

Use in Surgical Procedures—Also in oral surgery procedures it is essential to have the air as sterile as possible. The effect is only present,

however, as long as the machine is operating in the room.

Future Possibilities

Perhaps in the future every dentist will have his own electroscope so that he can actually measure the ionization. The weather bureau might also send out bulletins on this subject. Dental units would have built-in ionization devices to control the ionization of the air.

16½ West Main

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The EDITOR'S Page

THERE are more than 1,500,000 active diabetics in the United States. It has been estimated that 2 per cent of the population (4,000,000 persons) will probably develop the disease ultimately.¹ Although diabetes mellitus may occur at any age two-thirds of the cases are among the 40 to 60-year age groups. The disease is more common among women. The incidence is higher among those who are overweight. The complications of diabetes include: acidosis, that may lead to coma and death; pulmonary disease in many forms; boils and other infections; gangrene of the extremities and peripheral neuritis; eye complications; atherosclerosis, that may be a precursor of heart disease; periodontal involvements.

A recent study among young military personnel (20 to 32 years) emphasizes the relationship between diabetes and periodontal disease.² This is another commendable example of cooperation between an internist and a dentist in the evaluation of dental and systemic disease.

The conclusions reached in the study are:

"An old concept has been reused to advantage, as oral inflammation and infection were surgically and medically attacked among this small group of diabetic subjects. There is considerable theoretical conflict concerning the etiology of periodontal disease and gingivitis in all patients with or without diabetes mellitus. No characteristic organism or bacterial flora ever has been consistently implicated as causing periodontal inflammation. In the diabetic patient nutritional factors, such as subclinical vitamin deficiencies or previous periods of acidosis, may have featured as initial factors impairing local gingival metabolism. Resorption of alveolar bone and local abscess formation among the diabetics studied may have been on a neurogenic basis; however, there was no correlation between dental pathology and diabetic neuropathy. It is our clinical impression that diabetes mellitus and chronic, destructive periodontal disease are separate entities. Diabetics may be adversely influenced by the presence

of periodontal disease, and conversely periodontal disease may be more severe in the diabetic state.

"Trials of preoperative antibiotics for periods of 3 to 10 days in patients subjected to surgical treatment of periodontal disease produced no change in insulin requirements or in the state of diabetes. It was only after elective surgery had been accomplished that significant improvement in diabetic control was notable. It is therefore suggested that careful oral evaluation and periodontal survey be conducted in every diabetic patient.

"Gingival and periodontal disease are common in young diabetic patients. Treatment of oral pathology by elective periodontal surgery and extractions where indicated may improve the practical regulation of diabetic patients. Periodontal therapy need not be confined to treatment of small areas. Treatment of the total pathology at one operation proved beneficial in selected patients."

Collins and Crane give these overall suggestions for the management of the diabetic patient:³

"1. No dental work should be undertaken without the full consent of the medical consultant.

"2. Teeth with periapical infection should be removed, and root canal treatment should not be attempted.

"3. Extensive infiltration with local anesthesia should be avoided if possible.

"4. Great care must be taken in the construction of artificial dentures in order to avoid trauma; some patients may have difficulty in wearing dentures because of pressure pain.

"5. Surgical asepsis must be employed in extractions as the *diabetic patient is very susceptible to infection*. Epithelial ulceration and bone necrosis are not infrequent.

"6. If an anesthetic is required, local anesthesia with procaine is first choice. If nitrous oxide is used, the greatest of care must be exercised. Adrenalin should not be used in large amounts, as this substance tends to raise blood sugar. In diabetic patients, ether should be avoided because it may reduce the liver glycogen.

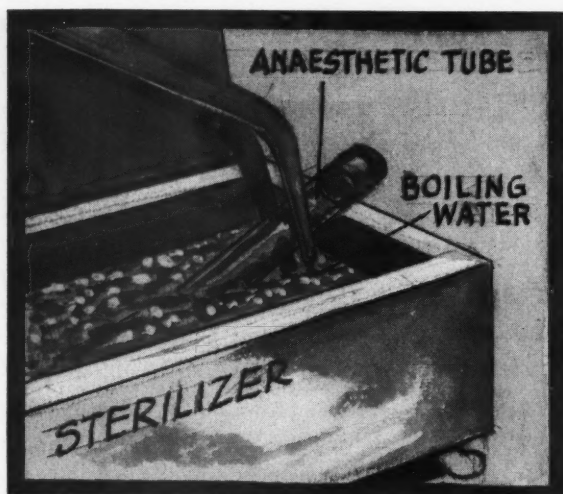
"7. An abscessed tooth is a distinct liability, the removal of which may improve not only the general health but also carbohydrate tolerance."

¹Collins, Leon H., Jr., and Crane, Martin P.: Internal Medicine in Dental Practice, ed. 5, Philadelphia, Lea & Febiger, 1960, p. 265.

²Williams, Ralph C., Jr., and Mahan, Charles J.: Periodontal Disease and Diabetes in Young Adults, JAMA 172:778 (Feb. 20) 1960.

³Collins, Leon H., Jr., and Crane, Martin P.: Internal Medicine in Dental Practice, ed. 5, Philadelphia, Lea & Febiger, 1960, p. 279.

1



2



3



Clinical and Laboratory

Administration of Local Anesthetic

L. E. Weil, D.D.S., Jersey City, New Jersey

1. The injection of a warm anesthetic solution is less painful than a cold solution. Dip the anesthetic tube in the boiling water of the sterilizer for a few seconds before loading the syringe.

Removing Silicon from Mixing Slab

Francis J. Bell, D.M.D., Van Nuys, California

2. To remove the unused silicon from the glass mixing slab use a cloth moistened with alcohol.

A Periodontal Syringe for Home Care

William S. Sutton, D.D.S., Kingsport, Tennessee

3. A thoroughly sterilized disposable type penicillin syringe makes an excellent gingival-wash syringe for home use by periodontic patients. Bend the needle and blunt the sharp point.

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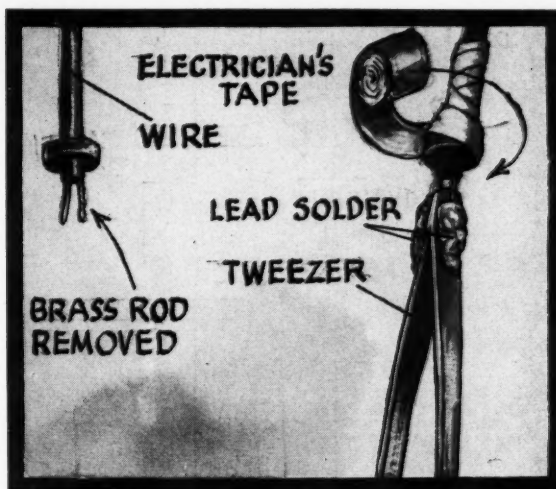
You do not have to write an article. Furnish us with rough drawings or sketches, from which we will make suitable illustrations; write a brief description of the

SUGGESTIONS . . .

Simplifying the Electrical Solder Unit

L. E. Murphy, D.D.S., St. Louis, Missouri

4. Remove the brass electrode and in its place attach a pair of heavy duty tweezers. The tweezers are soldered to the wires with lead solder and electrician's tape is used to cover the solder joint.

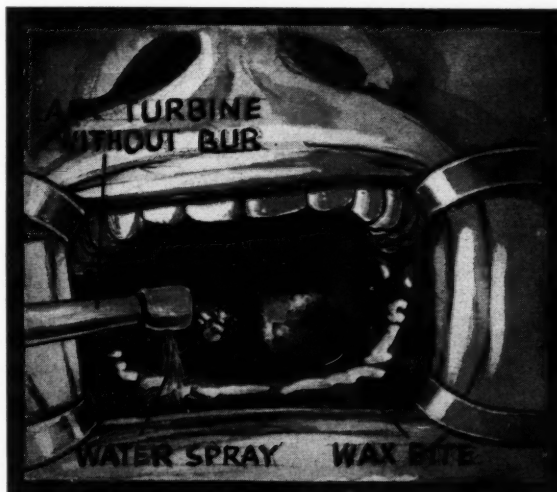


4

Cooling a Wax Bite

William L. Nufer, D.D.S., Danville, Virginia

5. Use the water spray of the air-driven turbine to chill a wax bite of a modeling compound impression. This cools the wax more rapidly than plain tap water, without the annoyance of overfilling the mouth with water.



5

Acrylic Denture Repair

Coen Oosthuysen, D.D.S., Vereeniging, Transylvania, South Africa

6. When self-curing acrylic is used in a denture repair the acrylic tends to "run" from the site of the application when the model is tilted.

To prevent "running," flame the new plastic momentarily and immediately blow out the flame. This creates a thin film that does not run.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 242 for a convenient form to use.

Send your ideas to Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

AIR

RETRACTION

in Periodontics

RAPHAEL ESCOE, B.S., D.D.S.

Massena, New York

DIGEST

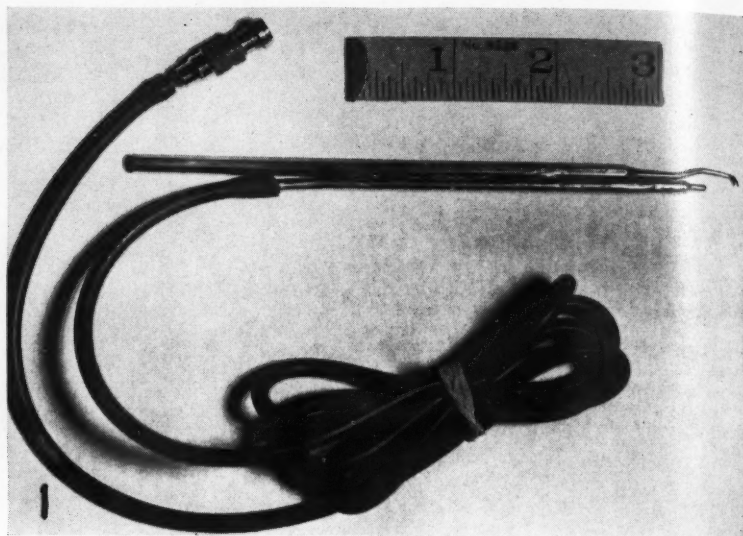
This article describes a technique in which a jet directs compressed air against the scaler blade. The jet is mounted on the scaler. The constant air blast supplied in this way retracts the outer wall of periodontal pockets so that calculus may be removed by direct vision. The air keeps the operative field dry and clean, and may have a salutary effect on the gingiva.

2.

Air is off. Calculus can not be seen.

3.

Air is on. Outer wall of pocket is retracted and calculus is visible.



1.

Scaler with tube and jet, hose, and fitting for attachment to air cut-off on unit (scale in inches).

Description of the Instrument

An ordinary scaler with a thin metal tube soldered to the handle is used. At the distal end of the tube is a jet which is focused on the blade. The proximal end of the tube is connected to the air cut-off on the unit by a long, thin rubber hose and fittings (Fig. 1). Compressors adequate for air-driven handpieces (40-75 pounds per square inch) will supply enough air.

Action of the Instrument

Subgingival calculus can be found only by retracting the tissue or by palpation. With this instrument the outer wall of the periodontal pocket

is retracted by the air blast and calculus may be seen by direct vision (Figs. 2, 3, and 4).

Technique Employed

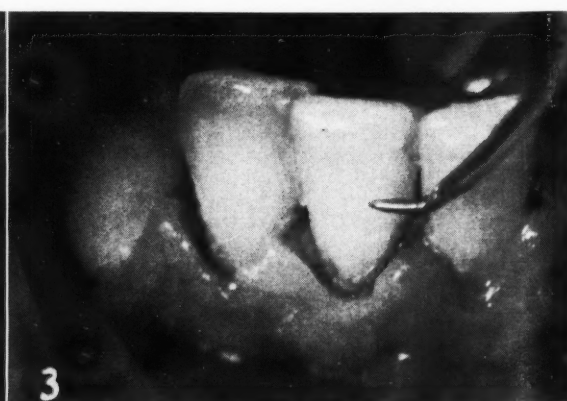
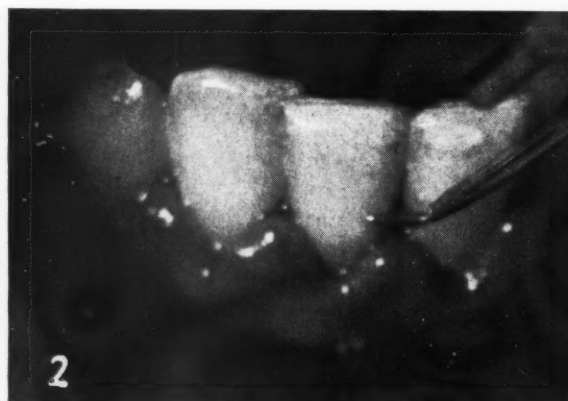
The root is scaled in the usual way except that direct vision rather than pure tactile sense is used.

Comment

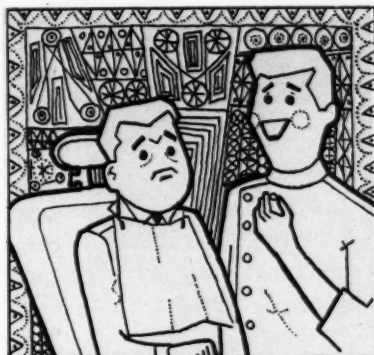
Despite high air pressure no emphysema was observed with this technique. Oxygen insufflation is thought to raise periodontal resistance.¹ The concentration of oxygen at the tissue surface at an air pressure of 75 pounds

(Continued on page 234)

¹Miller, S. C.: Textbook of Periodontia, ed. 3, Philadelphia, the Blakiston Company, 1950, p. 216.



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prophylaxis
is painful



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(Continued from page 232)



4.
A deep pocket showing the outer wall retracted to the epithelial attachment. Note how easily the calculus may be removed by direct vision.

per square inch, equals in concentration of oxygen, an environment of pure oxygen at normal pressure. The scaling operation is faster and more thorough because direct vision is used in a clean, dry field.

Main at Water Street

MEDICINE and the Biologic Sciences



Painful Injections

Often it is noted that transcutaneous injections are painful. Usually a fear of the needle is acquired in

childhood. The psychic trauma thus produced probably disturbs good doctor-patient relationships, often interferes with essential diagnostic procedures, and may invalidate lifesaving therapy.

The causes of immediate pain are local irritation due to the skin antiseptic or to parenteral solution, mechanical trauma which is related to the needle puncture and to distention of tissues, and abnormal sensitivity of the skin or skeletal muscle.

The application of cold to the skin eliminates cutaneous pain sensation. Spraying with ethyl chloride for two or three seconds before injection produces a satisfactory drop in temperature. The period of anesthesia is brief and the injection must be made the instant the liquid evaporates and the skin appears dry.

A sharp needle with the smallest possible diameter should be used. Barbs of the point should be discovered with a cotton pledget. The antiseptic solution is applied and allowed to dry before the spray is used. The spray does not interfere with antiseptic action.

Subcutaneous pain is induced only when an irritating substance is injected. A local anesthetic added to the solution reduces discomfort. Venous pain generally is caused by inept venipuncture. Quick puncture with a sharp needle causes little discomfort. Irritating solutions should be injected slowly to allow dilution by the blood stream. Slow injection also gives the patient opportunity to tell the physician if the solution is leaking outside the vein.

Normal muscle mass is virtually insensitive to dry needle puncture. Hypersensitive areas exist, however. When these areas are stimulated, pain is referred at a distance. Trigger areas should be detected before intramuscular injections are made. Palpation elicits local tenderness and referred pain. The painful area is hypercontractile and a visible twitch results. In addition, trigger points are more resistant to palpation than surrounding muscle. The deltoid and gluteus maximus muscles are least likely to cause referred pain.

Sites of chronic or recurrent pain and portions of the body previously subject to severe pain should also be avoided in intramuscular injections. If a twitch or referred pain results from the puncture, the needle is withdrawn to a point just beneath the skin and directed into the muscle at a different angle. Injections are made slowly and irritant solutions are diluted with 1 to 2 per cent procaine hydrochloride.

Delayed pain may result from infection, aseptic irritation, and necrotic antigenic reactions, acute muscle spasm, and pyrogenic reactions. Infection is usually attributable to multiple-dose vials or cracked or defective ampules.

Aseptic irritation and necrosis are likely if a nerve or blood vessel is injected. Peripheral neuritis or a thrombosed artery or vein may result.

Travell, Janet: *Factors Affecting Pain of Injection*, JAMA 158:368-371 (June 14) 1955.



Cerebral Palsy

It appears that unfavorable environmental conditions between conception and birth are associated with about 60 per cent of cerebral palsy cases. Less than 10 per cent of persons with the disease are injured by a postnatal factor. No specific etiology can be demonstrated in approximately 30 per cent of instances.

In the first hour of life 41 per cent of babies who already or subsequently have cerebral palsy usually are in poor condition. This compares to about 2 per cent of children without the disease. Most of the afflicted children have respiratory disturbances. Flaccidity, cyanosis, and poor cry are frequently noted. In some of these babies spontaneous breathing is delayed for six or more minutes. This compares with a rate of only 0.3 per cent of normal children.

The hospital stay of afflicted babies may be prolonged by respiratory dysfunction, repeated attacks of cyanosis, feeding difficulties, persistent unex-

(Continued on page 238)

Thermodent as an aid to everyday management of hypersensitivity

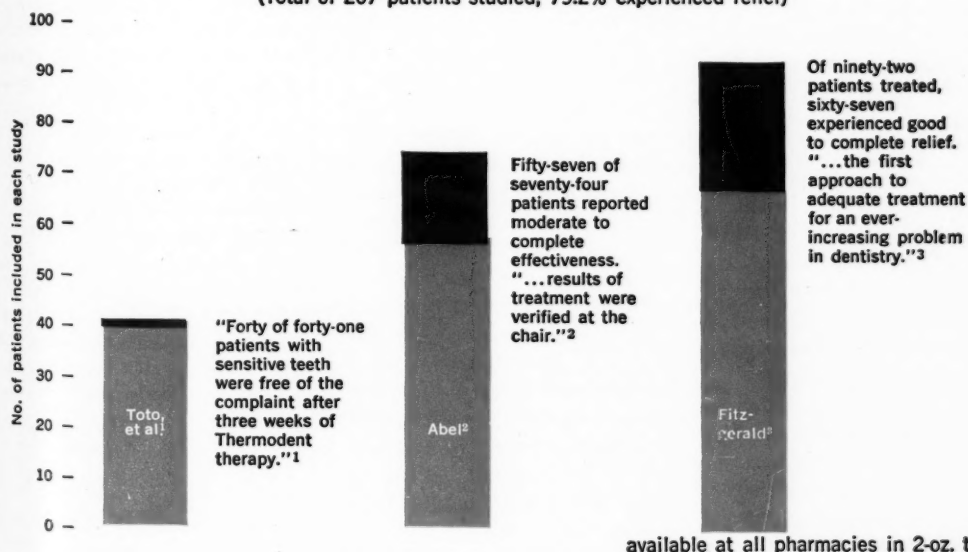
Published reports of clinical investigations show that patients who experience tooth pain from hot and cold or sweet and sour foods—as well as during cold weather—benefit measurably from regular brushings with Thermodent. In 571 observations on 92 patients, it was found that 42 per cent of the patients had complete relief of dentine hypersensitivity—and 30 per cent “good” relief—during regular use of Thermodent. All 92 patients “reported at least some benefit.”³

The reduced sensitivity afforded by Thermodent allows routine and thorough brushing for patients formerly unable to maintain proper oral hygiene. In addition, office visits are less painful because sensitivity to instrumentation is diminished—making for better patient cooperation and a saving of valuable chair time.

Thermodent for relief during painful dental procedures

In periodontia, for example, extreme dental sensitivity is normally encountered. In a recent study restricted to periodontal patients, the effectiveness of Thermodent as a desensitizing agent was shown by the following results: 97 per cent of the patients experienced complete relief from hypersensitivity after three weeks of Thermodent brushing, yet control subjects with sensitive teeth “were not free from the complaint after five weeks on a placebo.”¹

SUMMARY OF RECENT CLINICAL STUDIES SHOWING RESULTS OF THERMODENT THERAPY (Total of 207 patients studied; 79.2% experienced relief)



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1. Toto, P. D.; Staffileno, H., and Gargiulo, A. W.: J. Periodontology 29:92 (July) 1958.
2. Abel, I.: Oral Surg. 11:491 (May) 1958.
3. Fitzgerald, G.: Dental Digest 62:494 (Nov.) 1956.

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plained fever, or failure to gain weight. The average hospital stay of mature babies unaffected by cerebral palsy is about five days. Those afflicted with the disease are hospitalized approximately fifteen days.

The etiologic factor most commonly associated with cerebral palsy is premature birth. Among these patients the incidence of early birth is about 35 per cent. This is about six times the usual frequency. Complications that predispose to prematurity, especially placenta abruptic and placenta previa may be the causative agents. It is noted that no abnormal bleeding in the last half of gestation or in labor is associated with these premature births.

Nearly one-half of cerebral palsied infants sustain some mechanical, anoxic, or other injury before birth or during the delivery process. Anoxia may be the most important factor causing cerebral palsy. The incidence of antepartum bleeding after the twentieth week of pregnancy is high

among mothers of infants who have the disease. Placental separation with subsequent anoxia may be a frequent etiologic factor.

Neonatal fever may be a cause also. Since neonatal fever occurs most frequently after prolonged, difficult labors, trauma may be the cause of cerebral palsy and of the fever.

Cerebral palsy can be caused directly by infectious diseases occurring in infancy. The younger the infant the more serious is the cerebral damage likely to be. Infections contracted in utero may also be responsible. Intrapartum or neonatal fever should be combated with antibiotics.

Eastman, Nicholson J., and De Leon, Miguel: *The Etiology of Cerebral Palsy*, *Am. J. Obst. & Gynec.* 69:950-961 (June) 1955.

Accidental Swallowing of a Partial Denture

In the July 1959 issue of *American Surgeon* W. Furste and P. Watkins report the case of a 26-year-old woman who sneezed and swallowed a metallic support, and a sharp clasp at each end. Operative intervention was considered, primarily because of the projecting sharp points of the denture and not because of the size of the object. Fear was entertained that these sharp points might penetrate the gastrointestinal tract at the pyloric or ileocecal valves or at the duodenal or duodenojejunal curvatures. With conservative management, however, the partial denture moved slowly through the gastrointestinal tract, and, 6 days after being swallowed, it was found enclosed in a mass of feces.

From Medical Literature Abstracts, *Journal of the American Medical Association* 171:211 (Nov. 21) 1959.

Buy Security Bonds

Bactericidal Ultraviolet Radiation in the Operating Room—Twenty-Nine-Year Study for Control of Infections

DERYL HART, M. D.,
Durham, North Carolina

Twenty-three years of experience with ultraviolet radiation in operating rooms has led to the conviction that this method of decontaminating the air is both effective and safe. There have been no serious effects in the eyes or skin of the operating room personnel, but there has been a striking reduction in postoperative complications and deaths attributable to infections. Fatal infections in clean operative wounds numbered 17 in the 5½ years preceding, and only 2 in the 5 years following, the adoption of ultraviolet radiation for this purpose. Records of 4,585 operations and of nearly 700 postoperative deaths during a 10½ year period were analyzed and showed a striking superiority of results in the operating rooms in which ultraviolet radiation was used. With properly chosen fixtures, properly placed, radiation at wave lengths from 253.7 to 290.0 microns can be delivered with an intensity of 18 to 30 microwatts per square centimeter at the operative site. No evident permanent damage to personnel or patients has been detected during 23 years of daily use of such radiation in either the one original or the 15 now used operating rooms so equipped.

From *Journal of the American Medical Association* 172:1019 (March 5) 1960.

Contra- Angles



The Nature of Adolescence

MOST of us have forgotten our own twilight zone of maturity—except, perhaps, for the “slights” that we might have suffered from our elders. Adolescence is a stage of life that may appear any time between 12 and 21. It is not a specific age.

Our dental society programs and our literature cover the problems of pedodontics and now we are hearing more about geriodontics. I do not recall much discussion on the dental affairs of the adolescent, despite the high incidence of dental disease among young people who are in the process of maturation.

Caries and pimples and cracking voices are among the stigmata of adolescence. Puppy love that is a part of burgeoning may be a serious and even a disastrous affair. Coquetry is a hallmark in girls of this age. Defiance of authority is often encountered among boys.

Both the juvenile delinquents and the zealous idealists are found in this teeming biologic pool of adolescence. The delinquents make the headlines; the idealists are seldom given the recognition that they deserve. There are many more young people in the latter category than there are among the misfits.

A mistake that we make (as parents and dentists) is to treat the adolescent too lightly. We make fun of his gawking height with his arms hanging too long from their sockets and his feet spread too big. We chide him because he is a dawdler or for his dedicated seriousness on any issue that may seem quite absurd to us. The girl with the round-eyed adoration to a yelper of song over the airways may be a source of amusement to us—but not to her.

From our vantage point of age we are likely to inflict our authority on young people without regard to their feelings or sensitivities. I have made this grievous mistake as a parent and as a dentist.

If we wish to probe our own memories we can recall the elders who offended and traumatized us. I recall, with some bitterness of uncharity, the pompous ticket-taker at a baseball game who chased me from the ball park because I had entered by a devious route where a ticket was not de-

manded. The fact that I violated the ethic by using a hole in the wooden fence was no major scar on my conscience. The abrupt and rude ejection, although entirely proper by the man who was entrusted with the job, makes it hard for me after more than 45 years to say “God rest his soul,” (as my Celtic ancestors taught me to speak respectfully of the dead—even the deceased that one did not like too well in life). On this occasion of humiliation by rout, my adolescent ego

(Continued on page 242)

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A completely modern approach to the practice of prosthodontics, this comprehensive book can also give you up-to-date advice on periodontal preparation and endodontic problems.

By WILLIAM L. MCCracken, D.D.S., M.S., F.A.C.D., Professor of Dentistry, Department of Prosthetic Dentistry, University of Alabama School of Dentistry, Birmingham, Alabama.

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CLINICAL AND LABORATORY SUGGESTIONS

(See pages 182 and 183)

Form to be Used by Contributors

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708 Church Street
Evanston, Illinois

From: _____

Subject: _____

Explanation of Procedure:

Sketch:

Suggestion submitted cannot be acknowledged or returned.
\$10 will be paid on publication for each suggestion that is used.

was salvaged by a Circuit Court Judge who paid the ten cent admission fee for legal entrance. To this day the Judge is high in my esteem in the company of such jurists as Justices Oliver Wendell Holmes and Louis D. Brandeis. Of such is the nature of the never-forgotten sentiment of the adolescent: "God rest the soul of Judge Farrand!"

The dentist occupies a position of authority with the patient, if for no other reason than his power to inflict pain. I doubt if any dentist, unless he was deep in the psychosis of sadism, ever purposely inflicted physical pain to express his authority. Psychic pain is something else. We have all inflicted that: usually by some stupid remark or attitude. The adolescent is particularly susceptible to this kind of trauma, because he has not yet mobilized his defenses against the bore that often lurks in the personality of his elder. I plead guilty to treating adolescent boys and girls with less respect than they deserved: of *their time* and *their opinions* during the dental treatment experience.

It is encouraging to know that some of our medical colleagues are more aware of their adolescent patients than we dentists are. Two articles in medical journals are examples. Frederick C. Biehuse, M.D. writes on "The Adolescent—a Medical Misfit" in the *United States Armed Forces Medical Journal*:

"Adolescents are an in-between age group who fit neither into pediatrics nor internal medicine. The average physician has little interest or knowledge concerning this fascinating time of life. This is true in military medicine as well, where the sharp line of demarcation, the fourteenth birthday, will one day place the adolescent in the pediatric clinic (for which he thinks he is already too old) and the next day in the medical clinic (about which he may have apprehension because he sees few of his own age).

"The ideal answer would be a clinic where the adolescent could call his own, where he would be treated as an individual in a kindly and interested atmosphere. It is likewise true that, in time, we should strive for separate

adolescent inpatient units as well to provide well-rounded medical care.

"The adolescent is preoccupied with himself and his problems. He resists those who try to direct his life, yet is vulnerable to the person who shows interest, and responds with frankness and cooperation if he believes that genuine interest is being shown on his behalf.

"Characteristically these young people show concern about growth and development; feel the need to be popular; show beginning criticism of adults and their behavior; feel a need for success, and a new realization of religion; look for independence, and yet retreat from their problems because of continued insecurity.

"In seeking this new position they often deny the importance, continued dependency on, and authority of the parent. They thrive on praise. Directing this praise where it will do good, helping them to happy and successful experiences, and exhibiting trust—all contribute to the confidence they need.

"The world of the adolescent is one of continual motion and competition. They live strenuously, work and play hard, compete against each other, and yet still have a very strong feeling of belonging with 'the gang.' A premium is placed upon physical appearance, clothes, complexion, and athletic and scholastic ability. The adolescent appreciates honesty and frankness and considers anything else a misuse of the trust they are willing to place in the physician.

"The physician dealing with the adolescent is in an enviable position. He can offer the guidance, solid advice, and trust they seek. He is also able to provide a positive approach in clinical relationships. Adolescents prefer being told what they can do, not what they cannot do. The adolescent worried about obesity will take to a regimen that stresses what he can eat rather than to a series of dietary 'don'ts.'

"Adolescents react more favorably to the physician and his advice when it is apparent they are responsible for their own care. They prefer to be able

(Continued on page 244)

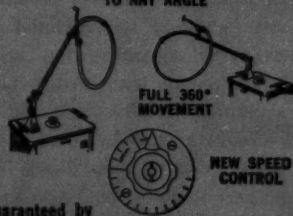
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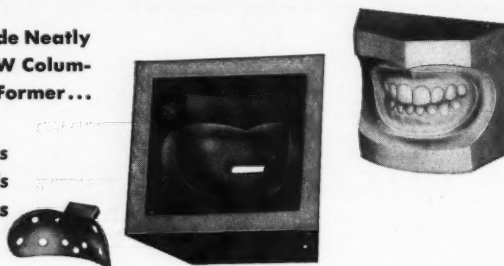
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to state their own problems and dislike being brought into the office in the magnificent wake of one or both parents. The office should be free of toys and of type of furniture that might give the impression that it is the office of a pediatrician. If the physician is to create a good impression, his own practice must be run in an orderly and punctual manner. Allowing adequate time for each patient is important. Neither party should appear or feel to be rushed. Initial conversation directed to sports, hobbies, and subjects other than medicine and school often foster friendship and serve to put the patient at ease."

The other physician, J. Roswell Gallagher, wrote in the *Connecticut Medical Journal* on "Adolescents and Their Medical Care." Doctor Gallagher said, in part, in his article abstracted in *Modern Medicine*:

"Adolescents, being overconcerned with themselves, are susceptible to interest shown in them but are also sensitive to an indifferent attitude. Unless the doctor gives as much attention to personality traits as to symptoms, the young person will break appointments and disregard advice and the treatment results will be mediocre.

"Adolescents have great concern for bodily defects which may seem

minor to the physician. Skin blemishes should be examined with more attention and more privacy than would be necessary were the patient a child or an adult. The rate of growth and extent of sexual maturation may be charged with emotional content for the adolescent.

"Symptoms frequently arise from anxiety concerning sex, changing relationship to parents, religion, disrupted home life, or school work.

"Adolescents often engage in strenuous activities to gain prestige and recognition. For example, a poor student may gain confidence by excelling in athletics. Whenever possible, therapy should be directed toward strengthening rather than resting the young person with chronic fatigue or a painful back."

Years ago when some of us first began to write in the dental literature on psychobiology and psychosomatics we were met with a chill of apathy and some hostility. This attitude has changed. Dentists accept the fact that teeth are part of a human body and that the human body is more than a machine: there is a personality in the patient with a disease. All, the total person must be understood and treated. This principle holds for adolescents and for every human being.

—E. J. R.

The Epidemiology of Atherosclerotic Coronary Heart Disease

JEREMIAH STAMLER, M.D.

Changes in Food Consumption

Intakes of milk, dairy products, and eggs have exhibited significant increases. A marked rise in ingestion of refined sugars (100 per cent empty calories) is another long-term development in the American diet: from 8 pounds per person per year in 1820 to 30 in 1860, 66 in 1900, and 95 today.

Decline in Grain Consumption—

Upward trends in consumption have been associated with a steady decline in grain consumption of such marked proportions that for tens of millions of Americans today bread can hardly be designated the "staff of life."

Decline in Percentage Utilization of Whole Meal—A qualitative metamorphosis in flour also has occurred over the decades, that is, a decline in percentage utilization of whole meal. The resultant nutritional losses have been only partly compensated by the limited bread enrichment measures of recent years.

Reduction of Bulk Intake—The increased consumption of highly processed, refined foods has also involved a decline in the intake of bulk that is only partly compensated by the increased ingestion of fruits and vegetables. Little study has been done on the possible implications of this trend for health and disease.

General Significance of Nutritional Trends—Within the limitations noted these trends are highly suggestive of a definite increase (relative and absolute) in consumption of total fats, saturated fats, cholesterol, and empty calories. This is the direction our country has apparently taken nutritionally in evolving its unique pattern of dietary imbalance.

(Continued on page 243)

Denture Esthetics and New Myerson Developments

Fourth New Dura-Blend Shade Improves Matching Accuracy

With the recent addition of three new shades, the Dura-Blend Shade Guide was tested and found to offer first choice for accuracy of match 44% more often than any other. Now a fourth new shade, M66, has been added, with color characteristics between those of M61 and M65. This has increased Dura-Blend's shade-matching superiority to 52%.

16 New Dura-Blend Moulds Ease Selection Problems

The 13 anterior moulds recently added made tooth selection with Dura-Blend plastic teeth more satisfactory than with any other teeth. Now in answer to requests from dentists, two new square upper moulds, and a new lower mould in the popular size range, have been added.

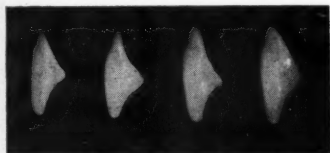


Figure 1. Slender forms, longer ridge laps, typical of new Dura-Blend Moulds.

Summary of Dura-Blend's Esthetic Advantages

1. 89% undetectable in tests conducted on dentists.
2. Greatest shade-matching accuracy and dependability.
3. Cover a wider range of cases. Available in smooth or rugged carvings.
4. Highest wear resistance and durability — preserves original esthetics longer.

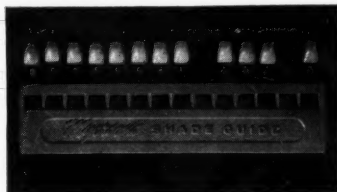


Figure 2. New Dura-Blend Shade Guide offers four additional shades.

Write for latest shade guide
(see Figure 2) and mould chart.
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91 Hamilton Street, Cambridge 39, Mass.

See page 238 D.D.5
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Opposing View

The conclusion stated here is not shared by all investigators. Some emphasize that little information is available on food actually consumed as distinct from data on food available for consumption. The difficulty of estimating waste of fats in cooking is stressed. Based on these and other considerations they suggest that there has been little or no increase in fat consumption in twentieth-century America.

Incidence of Coronary Disease Doubled—These writers are skeptical about the data indicating an increase in coronary disease incidence in middle-aged men over these years. Thus these authors imply that both fat intake and coronary disease incidence have been high since the turn of the century.

Consistent with Nutritional-Metabolic Theory—If these are actually the facts, and the two phenomena are so correlated, this certainly is not inconsistent with the nutritional-metabolic theory.

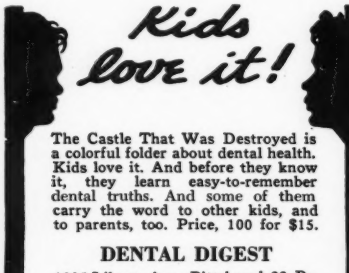
Additional Study Required—If fat intake has increased since the turn of the century, it was, as already noted, high even then. If coronary disease incidence in middle-aging men was much lower then, as some data suggest, why this lack of correlation? This question emphasizes the need, in evaluating the trends over the last 40 to 60 years, to focus attention not only on evolving dietary patterns but also on the interplay between diet and psychologic stress, and even diet and large-muscle activity.

Summary

The apparent changes with time in patterns of diet and disease may or may not be significantly interrelated as to cause and effect. These decades witnessed manifold changes in urbanization, automobile transportation, cigarette consumption, sedentary work, all phenomena emphasizing the need for multifactorial analysis of atherosclerotic disease causation. Because of these complexities and the limitations of both the mortality and the nutritional data, plus the insurmountable obstacles to their further delineation, extreme caution

is essential in interpreting them; the danger of "reading" cause and effect into the statistical correlation is particularly acute. With these reservations it is not inappropriate to note both the suggestive positive correlations and their consistency with extensive findings from other sources. Again it is valid to conclude that the concepts of the nutritional-metabolic theory are certainly not contradicted by these data.

Adapted from *Postgraduate Medicine* 25:621 (May) 1959.



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